Suburban Sprawl Alternatives: Retrofitting Residential Neighborhoods for Community Growth

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Submitted towards the fulfillment of the requirements for the Doctor of Architecture Degree.

School of Architecture
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We certify that we have read this Doctorate Project and that, in our opinion, it is satisfactory in scope and quality in fulfillment as a Doctorate Project for the degree of Doctor of Architecture in the School of Architecture, University of Hawai'i at Mānoa.

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a) Abstract

As a city's population grows, a need is created for increased housing. A traditional way to meet demand is to build new housing and commercial developments at the city's edge. As cities sprawl outward, limitless greenfield development becomes standard practice. The developed areas become predominantly low density residential areas that are reliant on automobiles. Increasing concern for suburban lifestyles in terms of health, transportation, environmental issues, etc. have validated exploration for alternative forms by numerous organizations.

After being developed, homes often have little connection to community resources and are occupied solely for private use until they fall out of favor for newer developments. The objective of the project is to improve existing efforts of alternative community design by providing methods to improve residential neighborhoods. The project aims to encourage community aspects while increasing the longevity and prominence of communities. In retrofitting existing residential neighborhoods, considerations for housing demands can also be addressed; directing growing populations to existing neighborhoods rather than continually sprawling away from cities. This project intends to create a design alternative to sprawling development and provide comprehensive techniques to retrofit suburban neighborhoods for community growth.

Executive Summary

The purpose of this study is to call for a design solution to prevent and reverse the effects suburban sprawl has caused within the United States. Evidence suggests that suburban sprawl continues to grow despite an increased awareness of the negative effects such development has on our constructed environment. Unless prevented or reversed, these negative effects will continue to permeate into the lives of the residents of sprawling suburbs.

Suburban sprawl is not a newly discovered concept. Numerous movements, organizations, and theories have attempted to change the way the country builds in an attempt to create better spaces for everyone. The noble cause of helping people who are suffering from exceptionally long commute times, lack of community, and sprawl-induced health issues is not yielding the results one might hope for. Movements to prevent sprawl and even repair damage created by it, which can be successful, are not changing the way people develop living communities by overlooking some of the most critical issues. The belief that many Americans would choose to live in a house with a large yard rather than shared building spaces and green spaces with others is an example of an issue that makes matters difficult to combat sprawl. New Urbanists have developed highly intricate models to improve suburban forms, but they admit that there is a low demand for re-developing existing residential neighborhoods.

The issue is complex, but it should not be left at that statement. If models to improve areas plagued by suburban sprawl are not in high demand, then it cannot be possible that design solutions are feasible to all consumers, developers, or governing bodies. This body of research strives to deliver a model by which suburban communities are given the tools to re-develop themselves via customizable programs with flexible time frames. Communities need to know that if done correctly, proper re-development is not only going to help developers and concerned environmentalists, but also communities themselves, which will benefit from embracing modest retrofits to their existing bedroom communities.

This study will not only provide the tools, reasoning, and requirements for new development within an existing community, but it will demonstrate that the net positive effects from re-development can benefit the citizens who might otherwise be concerned about change that the community would have to endure. Re-development can benefit a community as a whole far more than one may perceive. It is possible that though re-development, reliance on gasoline is decreased, natural land and species are preserved, and lifestyles are improved. Developments do not have to be large scale and invasive. Furthermore, money

may be saved through reducing personal time invested in commutes and decreasing gasoline expenditures. All combined, these can change communities for the better.

b) Background / Field of Study

There is an abundance of research on urban sprawl that helps provide an accurate definition of what it is comprised of. The five main components that comprise sprawl are: housing subdivisions, shopping centers or strip malls, office parks, civic institutions, and roadways as identified in *Suburban Nation* by Andres Duany, Elizabeth Plater-Zyberk, and Jeff Speck[1]. *Suburban Nation* provides an introduction to the negative aspects of suburban sprawl including transportation, segregation of society, and undesirable effects to its residents. However, sprawl continues to grow despite the acknowledgement of its negative effects on quality of life. In *Design First,* David Walters and Linda Louise Brown support this point of view:: "Calls for change can be heard as the negative effects of suburban sprawl – environmental pollution, loss of open space, heavy traffic, and long commutes – impinge on the public's consciousness, but the vast majority of communities continue to grow unchecked."[2]The current process of buying a home is in a state that sprawled developments are bought into without the buyer always knowing the repercussions of the action. *This Land: the Battle over Sprawl and the Future of America*, by Anthony Flint, suggests that when people are driven to live and work in sprawled areas it becomes a "curse" to its investors. Flint claims that sprawl begins at the residential level when consumers find large and attractive homes of suburbia within their financial reach. For the consumer,

[1] Andres Duany, Elizabeth Plater-Zybeck, and Jeff Speck, Suburban Nation: The Rise of Sprawl and the Decline of the American Dream, New York: North Point Press, 2001. 7-16
[2] Linda Brown and David Walters, Design First: Design-based Communities, London: Architectural Press, 2004. 3

this has the illusion of an “Instant Eden”. He adds that suburban homes are appealing to a great number of potential investors. The attraction from many investors is responsible for rapid growth of neighborhoods. As the suburban population increases, collector roads become congested and commutes between work, school, and amenities become an expensive and unhealthy waste of time. This waste of time was estimated by the Texas Transportation Institute and amounts to, in the words of Flint, “3.7 billion hours, wasting $63 billion in productivity and the cost of 2.3 billion gallons of fuel for idling engines in traffic.”[3] The citizens of the United States are spending money to waste time, to disengage from society, and thereby become reliant on vehicular transportation and oil while disrupting the natural environment.

The severity of concerns regarding community, transportation, and quality of life issues are enough to warrant further study. The numerous concerns suggest that improvement must be made in sprawling developments to support the welfare of the communities. Instances of how suburban communities continue to grow are apparent, even in areas where the fight against sprawl is strong, such as Portland, Oregon. There the efforts made against sprawl are insufficient and the city continues to grow. Portland made attempts to control urban sprawl by creating a limit that the city cannot grow past. Portland grew by 39 sq. miles from 1980-1990 and is continuing to grow[4]. This shows that such measures to control sprawl are insufficient.

One party that supports the growth of urban sprawl is consumers. Consumers invest in and purchase developments and in doing so support them financially. There are existing theories that consumers are victims rather than the cause of sprawling development. It has been argued that consumers are merely being pulled in to sprawled communities, attracted by low home costs and a share of the “American Dream”: a single family house with a large yard, a two car garage,

[3] Anthony Flint, This Land: The Battle Over Sprawl and the Future of America, Baltimore, MD, John Hopkins University Press, 2006
[4] Sprawl City. Outcome of Portland Experiment Still Uncertain. http://www.sprawlcity.org/portland.html

and a fence between homes[5]. The same people eventually find that they have invested in a less than convenient lifestyle cleverly pitched by developers. *Urban Sprawl: A comprehensive Reference Guide* adds reasoning to why consumers prefer a suburban style of living. “Robert Burchell argues that the bias toward sprawl is embedded in the American psyche as part of the frontier mentality… Today’s sprawl is the frontier of long ago; it is akin to the postwar suburb – both of which have been extolled as defining American influences.” [6]

It is reasoned that consumers invest in sprawled developments both because of an inner preference for them and simply because they readily available. The suburban home may be the only place available to offer a large amount of square footage, outdoor space, and privacy that is also affordable. Although it is logical to argue that Americans have become accustomed to having no urban growth boundaries, it is difficult to state that the reason consumers choose to live in sprawling neighborhoods is simply because they do not know any other way.

Developers are another contributing body to sprawl. The idea of developers being the source of sprawl is validated by what they provide to consumers, the real estate that they invest in. Theories exist that developers are victims of poor planning by bodies of law and are forced to develop in a sprawling fashion to stay in business[7]. Contrary to this idea, a study of the thought process of developers has been clearly exposed in *Dewberry & Davis’s Land Use Handbook*. The book is regarded as a primary resource for greenfield developers and engineers. The guide contains brief mention (2 of 1135 pages) of Smart Growth principles and pedestrian considerations, suggesting that new developments are being planned with little difference in overall technique between 2008 and 1988.

[5] Andres Duany, Elizabeth Plater-Zyberk, and Jeff Speck, Suburban Nation: The Rise of Sprawl and the Decline of the American Dream, New York: North Point Press, 2001. 34-40

[6] Urban Institute Press, Urban Sprawl: Causes, Consequences, and Policy Responses. Washington: Urban Institute Press, 2002. 4

[7] Andres Duany, Elizabeth Plater-Zyberk, and Jeff Speck, Suburban Nation: The Rise of Sprawl and the Decline of the American Dream, New York: North Point Press, 2001. 45-54

It is evident that developers face many restrictions to possible land development, but it is also apparent that a level of neglect occurs toward the environment, the well-being of potential residents, and possible experiential repercussions that their developments may bring. After understanding developers' limitations in addition to how they are taught to design, it is justifiable to conclude that sprawl is easily created in the United States. Developers can be constricted by policy and it is necessary to provide a told to allow developers increased design options that work with existing policy while retarding the nation's current sprawling trends.

A third party responsible for the growth of sprawl is governing bodies and their policies. Policy has been blamed for the initial creation of sprawl. Post WWII Federal Housing Administration and Veteran Administration loan programs made it possible for over 11 million single family homes to be built[8]. Governing policy ultimately holds the responsibility of allowing sprawling developments to be built. The lack of diverse zoning and regulations to support alternative developments facilitates the continuation of sprawling trends. *The Geography of Nowhere* by James Kunstler provides a series of arguments regarding why better neighborhood planning, namely mixed use zoning, should be legal, but limited to only what policy approves[9]. Pro-Smart Growth or New Urbanist ideas are addressed with an analysis of backlash and failed policy change that contribute to the complexity of sprawl in *This Land: The Battle over Sprawl and the Future of America*. The book, in addition to *Urban Sprawl: Causes, Consequences, and Policy Responses*, is an in-depth reference on the struggles involved in the politics of suburban sprawl. The books' references to the fight against policy is limited to electing officials for local or county governments, state governments, and federal governments with the suggestion of getting someone to proactively

[8] Andres Duany, Elizabeth Plater-Zyberk, and Jeff Speck, Suburban Nation: The Rise of Sprawl and the Decline of the American Dream, New York: North Point Press, 2001. 1-2
[9] James Howard Kunstler, Home from Nowhere: Remaking Our Everyday World for the 21st Century. New York: Touchstone Press, 1998. 217-245

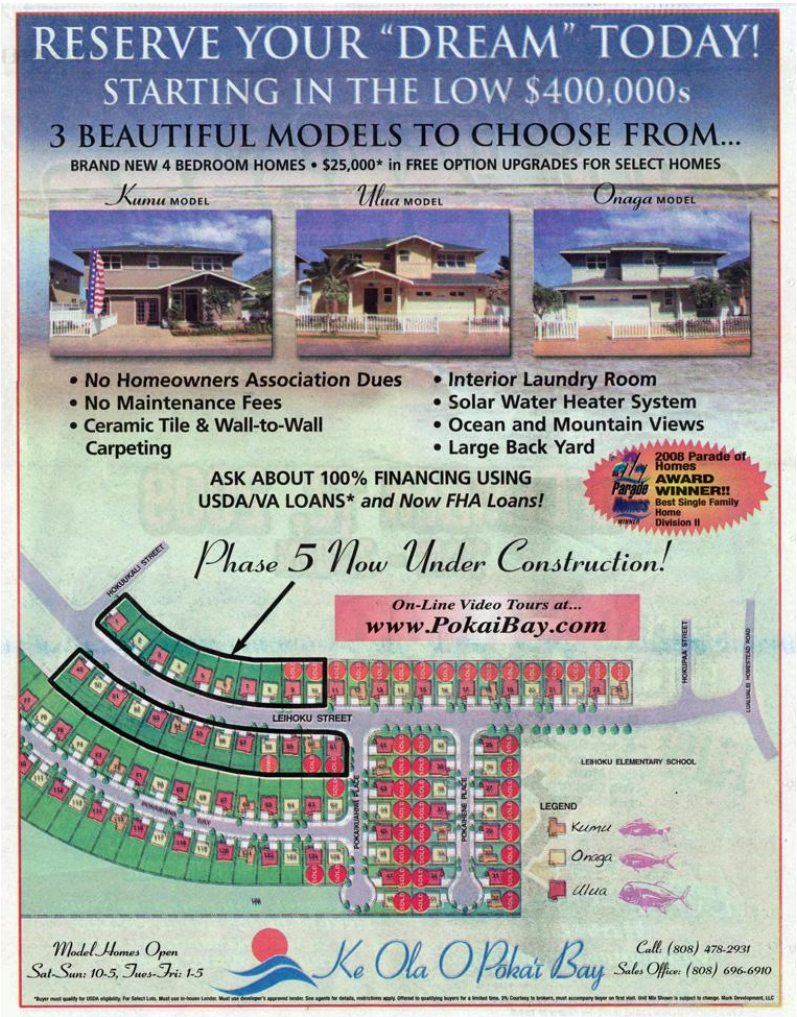
fight sprawl through policy change in office[10] [11]. From these sources, it is clear that the field of preventing suburban sprawl is in need of proactive leaders and design solutions.

The process of changing land use policies may be lengthy and often unsuccessful, but this process must be pursued in order to support policy change. Investigation of government bodies needs to be researched to determine the extent of Smart Growth, New Urbanism, or other anti-sprawl philosophies that are being incorporated into city and regional planning. The extent of what is possible as a developer or architect is limited without policy change. Architects and developers need to have strong political support and direction to make improvements from the current model of development.

c) Doctorate Project Statement

This research aims to analyze and understand the market focus and political environment that have contributed to urban sprawl for the purpose of finding and proposing alternatives. Currently, it is claimed that urban sprawl destroys cities, communities, and rural land. Concepts and ideologies such as New Urbanism and Smart Growth have been promoted in attempts to offer alternatives to spreading development. Despite the movement against, the sprawling growth patterns continue as manufactured suburbs, strip malls, and business parks and contribute to the current controversy.

[10] Urban Institute Press, Urban Sprawl: Causes, Consequences, and Policy Responses, Washington: Urban Institute Press, 2002. 141-165
[11] Anthony Flint, This Land: The Battle Over Sprawl and the Future of America, Baltimore, MD, John Hopkins University Press, 2006. 127-148



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From understanding how sprawl is affecting the country, the research determines the reasons why sprawled development is occurring. The issue of sprawl is researched with consideration to consumers, developers and policies. Each party contributes somewhat to the formation of sprawl. With a firm understanding of what is driving each party to support certain design parameters that contribute to sprawl, it can be better understood how an alternative model can improve on existing practices. With an understanding of development alternatives and why they are failing to become new design standards, a new model can be introduced that can account for re-development of any size with the purpose of quantifying the value of re-development to a given community.

d) Research Documentation

Homes, where as much as one fifth of the population resides in first ring suburbs[12] alone are occasionally faced with hard economic times. Economic downturns leave many families unable to afford mortgage payments and cause mortgage brokers to send homes into foreclosure. In Hawaii alone, home foreclosures rose 286% from January 2009 to 2010 causing homes in foreclosure on the islands to reach 1 in every 394 households. Growth from Honolulu directed toward the Ewa plain, where sprawling residential neighborhoods are being developed, accounted for the majority of foreclosures in the state in January 2010, which at the time ranked 11th in the nation for highest foreclosure rates. Kapolei, which also is located in the Ewa plain, and Ewa Beach comprised 260 of the 814 filings in the entire state in January[13].

The economic pressure that created a down turning housing market is a direct reflection of personal and national debt. Housing markets have historically been able to remain stable throughout the years. Since the start of the recession of the 2000 decade, people started losing jobs and as of April 2009, 5.1 million jobs had been lost with millions more after[14]. Without their income, families who purchased homes through mortgages and who owed lenders money became unable to fund the monthly payment. With the great number of foreclosures occurring, lenders, which are commonly banks, were left to manage the properties. Banks typically do not have the ability to manage the vacant homes and they are sold at lower than market value prices, if they are sold at all. Because of an availability of quality homes at cheap prices, the value of all homes dropped accordingly. In 2007, average home sale prices dropped from

[12] Ellen Dunham-Jones and June Williamson, Retrofitting Suburbia: Urban Design solutions for redesigning suburbs. Hoboken, NJ: John Wiley and Sons 2009. 20
[13] Allison Schaefers, “Foreclosures on the Rise” Hawaii Star Bulletin 2/11/2010. 16
[14] Rex Nutting, “Economic Report: 5.1 Million jobs lost in this recession so far” The Wall Street Journal, Marketwathc.com/stpry/job-losses-breach-5-million-mark

$271,000 to $239,000[15]. When the rates of foreclosures are rising, it is fair to say that decreases in home values will also occur. With an abundance of low-priced, single-family homes on the market, families in need of relocating may find it difficult to gain a return on investment on their homes or they may be unable to sell their homes in the slumping market.

It is possible that the high demand for homes within sprawling residential neighborhoods are coming to end. Projections suggest that in the near future, demand for suburban homes will regress. Data from the trends of a study of the baby boomer generation, and the echo-boomer generation (children of the baby boomers) show that suburban residential neighborhoods are not in their future plans. The study shows that 77% of the echo-boomer generation plan to live in an urban core and 70% do not think they will move to the suburbs when they have children. With the baby boomer generation entering retirement, it is a concern how the elder generation will operate in suburban settings. Over half of non-drivers 65 and over stay home because there are no transportation options. 71% of the older residents would prefer to live within walking distance of mass transit[16], which is not typically feasible in suburban settings.

If homes remain and become increasingly vacant and unsold, the remaining community as a whole suffers from effects of the un-maintained dwellings. Not only is it possible for squatters to live in vacant buildings, but vacant buildings create an array of other problems for the community. A study in Austin, Texas found that areas with vacant buildings had 3.2 times as many drug calls to the police, 1.8 times as many theft calls, and twice the number of violent calls as opposed to neighborhoods without vacant homes[17]. Deteriorating lots become a symbol of poverty in the area which creates more issues. Over 12,000 fires occur in vacant structures each year, requiring $73 million dollars of public funds to fight and clean up the buildings, which are primarily burnt down by

[15] Jennifer Openshaw, “How to Find True Values in Foreclosures” The Wall Street Journal, Marketwatch.com/story/the-quickest-path-to-finding-true-forclosure-bargains
[16] Robert Steuteville, “How to Mitigate the Impact of Big Box Stores” New Urban News, July/August 2006.
[17] National Vacant Properties Campaign: Vacant Properties: The True Costs to Communities. Washington, DC: National Vacant Properties Campaign, 2005. 1

arsonists[18]. Occupied homes remaining in the community must deal with lower property values and higher insurance rates as a result. A Temple University study shows that the closer a home is to a vacant building, the more property values depreciate. Within 150 feet, property values were found to decrease $7,627. Within 300 feet property values decreased an average of $6,819 Homes within 450 feet of the vacant building dropped $3,542 in average home value[19].

Trends showing risk to investors of suburban homes validate that a cohesive community design strategy, such as a New Urbanist form, is necessary to ensure that individual investments in the community are returned. When housing markets are struggling economically, all neighborhoods run the risk of deteriorating. When multiple houses in a community are sent into foreclosure and cannot be filled, entire regions can be harmed. Areas such as older suburbs in Detroit and Las Vegas, which had the highest amount of foreclosures of any city with 12%of households in 2009[20], are among areas where severe damage has occurred and entire communities lie vacant. Introducing a new urban model to communities that have failed may be widely accepted and readily aided by programs such as Hope VI re-developments. It is important, however, to find a way to preserve existing communities that are in danger of downturn to save time, money, and promote prosperity rather than waiting to change urban models only after failure has occurred.

The need for an alternative: Congress for New Urbanism

The outstanding issue of growth management strategies is addressed by several established organizations. State governments are in control of

[18] National Vacant Properties Campaign: Vacant Properties: The True Costs to Communities. Washington, DC: National Vacant Properties Campaign, 2005. 1
[19] Temple University Center for Public Policy and Eastern Pennsylvania Organizing Project. “Blight Free Philadelphia: a Public-Private Strategy to Create and Enhance Neighborhood Value.” Philadelphia, 2001.
[20] CNNMoney.com: “Foreclosure plague: 2009’s Worst Hit Cities – Jan. 28, 2010. money.cnn.com/2010/01/28/real_estate/foreclosure_cities_growth/idex.htm

development policies and often defer control to local branches of government. The divided policies often translate into multiple governing bodies controlling a single metropolitan area. In cases where policy is divided, city ordinances may provide development standards within city limits while surrounding townships, unincorporated areas, etc. follow the template that allows sprawling neighborhoods and feed off of the greater metropolitan area.

Supplementary to legislative efforts to provide well developed growth strategies, numerous organizations have been developed with the intentions of changing the set system. One of the most influential organizations in the fight against sprawl and advocates of community development is the Congress of New Urbanism. Formed in 1994, the Congress of New Urbanism is an international organization dedicated to the replacement of sprawl with a neighborhood alternative. The organization developed a detailed charter in which the rules for designing developments are outlined. Though the outcome lobbied for is well intentioned, there is reason within that makes the efforts of the organization less effective than it potentially could be. While each point of the Congress for New Urbanism charter holds worth, there remains a need to develop a strategy of how to achieve the organization's aspirations.

Perhaps the largest issue why New Urbanist development plans fail to become widely utilized is because policy usually must change to support their ideas. For New Urbanist plans to work properly, governmental cooperation, public policy, physical planning, and economic strategies must reflect the organization's metropolitan plan.

Governmental cooperation would require elected individuals in power to authorize changes of general growth plans, where in some cases, have been relatively idle for generations. A problem with changing policies and restricting certain developments is that it can appear to be against the idea of a capitalist society in which the United States was built. Development regulations are generally handled by the state, which are often (but not the case in Hawaii) given

to local governing bodies to interpret and enforce[21]. If the United States as a whole was to embrace new development guidelines, including possibly adding growth boundaries, it would require a President and a majority of house and senate members to approve. With the nearly limitless freedom to build, expand, and develop that exists in danger of being taken from the public, there is likely to be a public outcry which will prevent at least one of the political branches from giving support to such a bold change.

Without the continuity of federal government regulating development, power remains within the states. While it is much more reasonable for a single state to adapt new growth and development policies, it can merely relocate the issue of sprawl. For example, if New York State adapts development standards similar to the Charter of the New Urbanism, New Jersey could potentially benefit as a state by allowing cheap, sprawled expansion near state lines. If only certain states enforce new development regulations, competition between states or regions to attract development will occur. While it is unreasonable at this time to expect the federal government to become active in the fight against sprawl, it may be possible in the near future to see a system that discourages sprawling development. With government programs such as the EPA's Smart Growth or Hope VI striving to improve on the nations' building errors, it is possible to see a program arise in regulating potential errors from occurring again. With the majority of development regulation falling in the hands of the states, it is usually deferred to local government branches, which turn into zoning and general growth plans for cities and regions. The scale of cities and regions may be manageable enough to be a viable target to promote new design policies.

Urban planning is another body that the Congress for New Urbanism needs to follow in their theories in order for their efforts to be fully effective. The issue that lies within urban planning is that what to design is not always decided by planners. Commission to stay in business comes from developers who determine what to build and where. Developers' interests are likely financially

[21] Jonathan Barnett, Redesigning Cities, Chicago, IL: Planners Press, 2003 11

driven to net the most money while risking the least amount possible. Developers need to be committed to a program that may be a great risk. Under the plan of the Congress for New Urbanism, developers need to be provided with a strategy that is comparable in terms of risk to low risk models of investment such as sprawling residential neighborhoods.

The charter for the New Urbanism also suggests that development should not eradicate metropolitan boundaries and that infill development is necessary. The issue with re-development within boundaries of cities relies on two major factors, economic viability and regulation. Most often, undeveloped land is cheap for developers. Because of this, developers are able to buy larger quantities of the land than within an urban core. With the extra land, they can afford in an undeveloped site, developers can not only save money by building on inexpensive land, but also design requirements such as providing parking are more affordable than in urbanized areas. An at grade parking space costs about $1,000 per space as opposed to $10,000-$12,000 for a parking garage space or $20,000-$30,000 for a sub-grade parking garage space[22]. Jonathan Barnett of the American Planner's Association simplifies: "a good way to gain a price advantage for office development is to buy cheap land with good access and get it rezoned for offices. Then the developer has enough room to build at-grade parking, which provides a big price advantage over a developer who has to build a garage." Greenfield development holds these undisputed financial advantages for developers. Inexpensive land within a primary urban center can found, but the land often has drawbacks to developers. Vacant urban spaces are often brownfield sites. The areas can be derelict and generally unattractive to potential developers. Crime and low demand for new developments in dying parts of a city makes successful development in these areas unlikely. Regulation, however, may make it possible for developers to not have the option of creating sprawling greenfield developments. Regulating city boundaries is an issue described later in the writing. It is more likely that developers are presented with incentives to

[22] Jonathan Barnett, Redesigning Cities, Chicago, IL: Planners Press, 2003 51

either re-develop more expensive urban land or revitalize urban brownfield. Whether by law or by incentive, if developers reverse sprawling practices and build within established boundaries, it may be possible for trends of sprawl to reverse and direct development toward city centers, and eventually revitalize inner city cores.

A New Urbanist idea that can be useful in a residential retrofit is that continuous development should maintain city organization and that non-continuous development should be an independent city with its own boundaries. Although sprawled residential neighborhoods share connections with cities through a system of roadways, they are generally not associated with urban cores and can be considered a non-continuous development. The benefits or being part of a mixed use community are important and need to be incorporated into current developments as well. Given the distance of some residential neighborhoods from the edge of the city it is likely unrealistic and undesirable to be able to expand the city to connect with outlying neighborhoods. This prevents cities to have the ability to introduce opportunities for walking, working, etc. A way to introduce amenities of a well-designed city to the suburbs is to find a way to transform them into communities with the ability to be self-sustaining. With a plan to allow suburban settings the ability to grow into a more efficient communities where public amenities can operate and benefit residents, communities can achieve a degree of independence from the cities they have sprawled from.

Another thought within the Charter for the New Urbanism is that historical influence should control development. While the term *historical* is ambiguous, it is likely referring to a traditional, New England style of city planning rather than recent history that has resulted in the creation of sprawled development. It is important that key elements of historically functional developments should be studied and retained in future development. It is also important, however, to be critical of historic developments. There are reasons why society does not continue to develop in such manners. The communities responsible for

influencing alternative developments (including sprawling models) are key components of historical community design as well. While it is heavily promoted by organization such as the Congress for New Urbanism that mixed use development positively affects communities, the features of sprawling communities that attracted its residents need to be considered.

Crime is a key factor when determining how a city should be planned. For example, when Le Corbusier, a father of the modern movement, came to the United States, he attempted to improve life for the poor. He did this by designing large housing towers where the poor were able to have a sufficient home with green space in between. The result was possibly a contributing factor for rapidly sprawling cities. Poor residents could not afford to maintain the massive spaces and inner cities were left with a concentration of poverty stricken families and crime rates rose in those areas. When many urban cores became crime ridden, the attractiveness and demand for homes in safer areas of cities grew.

A New Urbanist fundamental is that inexpensive housing for the poor should be available and spread within a neighborhood. This will avoid the possibility of concentrating poor populations. It gives members of the poor community an opportunity to enjoy the benefits of a well-designed city and presents opportunities such as worthy employment near home. Currently sprawling residential neighborhoods are typically catered to only the middle to upper middle class. Everyone in the community must have a car because roadways are the only way in and out. Everyone in the community must also be wealthy enough to be able to afford to mortgage an approximately 3-5 bedroom house. If lower income families were present in these areas, there would be workers available to perform low skill jobs in community amenities such as a corner store clerk. Giving opportunities for the poor to succeed in a community allows the neighborhood to have a more diverse population while alleviating the concentration of families within poverty stricken areas.

One of the issues addressed in the Charter for New Urbanism states reasons why sprawled developments need to be changed due to transportation

issues. Aside from the woes of traffic and high gas prices, a community cannot attract a variety of residents and visitors if it is inaccessible to certain transportation options. The belief that communities require a variety of transportation is another concept in the Charter for the New Urbanism. Some sprawling neighborhoods may have sidewalks, but they often lead nowhere and are discontinued at intersections of highways and redirected at culs-des-sac. Aside from the introduction to public amenities within residential neighborhoods to increase walkability, the inclusion of mass transportation has the potential to be a difficult process. With residential neighborhoods being less populated compared to other parts of a city, mass transit system is not ideal, but access to a greater transportation system is. The inclusion of bus systems would allow residents without an automobile to access the city and possibly attract other people to the area. If an area is close enough to a city core to be near existing bus lines, such as in the Ewa plain on Oahu, it will likely be easier to add a new bus stop to an existing route or to add a new route. If an area is farther away from the city core, there is a strong possibility that public transit does not run near the area. It may not be possible without proper funding to supply a bus route to further locations due to low number of passengers for operating in an area where there is a dependency on the automobile. If a residential neighborhood needs to be tied into the urban core by means of mass transit, is likely most viable to do so in neighborhoods that are near urban cores that have a better expansion potential to public transit routes. First ring suburbs offer scenarios where it is possible to add mass transit options, and when being hit by economic downturn, display need and ability to become successful re-developments. According to the Charter of the New Urbanism, the metropolis is made up of neighborhoods, districts, and corridors. This study focuses primarily on neighborhoods, but it is important to know how they tie into one another. The charter states that neighborhoods should be mixed use, districts should be single use, and corridors are the space between creating a segue between the two. This means that neighborhood areas do not require all types of uses to be truly mixed use as long

as a viable transportation corridor is available between single use districts and neighborhoods.

Within neighborhood settings, the charter describes that activities or public amenities should be close to home. This will better allow the independence of young and old residents because they do not always have the luxury of being able to drive or own a car. The idea also supports the diversity of a community through age variation and reduces the focus from middle aged, automobile driving residents. The tactics to provide amenities within an existing community are addressed in section h. Often, children and elderly parents depend on middle aged families for housing needs. These people, however, can become secluded within their home and become at risk of health concerns such as obesity or depression. As pedestrians, minors and the elderly have little reason to go outside because they cannot realistically walk to public amenities. They cannot travel from suburban areas outside of the schedules of a household driver because of a lack of transportation options. Providing necessary amenities in an existing neighborhood is a difficult task to do sensibly because land will need to be sacrificed for developments within the community. Finding a way to provide extra space for new amenities is one of the obstacles in proposing how to retrofit a residential area into a mixed use community.

Strengthening the personal and civic bonds between people within communities is another goal in the Charter for the New Urbanism. They advocate that by providing a variety of housing types, a variety of people will live in the neighborhood. The desired connection between different classes, ages, races, etc., in a community will help to break apart from the repetition of a traditional suburban neighborhood. The demographics that comprise suburban neighborhoods, however, already have a variety of household types occupying homes. According to the United States 2000 Census, in metropolitan areas with a population over 500,000, suburban households comprised of: 29% non-family,

29% married with no children, 27% married with children, 8% other family with children, and 7% other family with no children[23].

Transit corridors are perhaps the most identifiable part of urban sprawl. Because of personal automobiles, it is possible to develop according to existing roadways and infrastructure. The Charter for the Congress of the New Urbanism states that investments traditionally given to city centers should not be used to develop corridors. If corridors, which are most commonly highway systems, are developed, the result is growth patterns that are based on growth of highway systems, which are generally not intended to guide development in expanding cities.

When orienting a town around a mass transit system, the Charter for the New Urbanism states that the areas near the mass transit access must have proper land uses and densities. By doing this, it is possible for mass transit to become an alternative to automobile dependence. The issue with residential neighborhoods being able to acquire “proper” land densities is that a higher population density will have to be introduced to areas that were built to have low population densities. Members of the existing neighborhood are likely to revolt change, because the existing community is what attracted them to live there. It is necessary in re-development to be able to maintain qualities of the existing neighborhood to preserve the attractive qualities of the neighborhood. This way, re-development aims to improve the existing community rather than changing it entirely.

Civic and institutional development is an integral part of the New Urbanist neighborhood model. These buildings of importance that include schools, firehouses, and community centers are often non-existent in sprawled neighborhoods. Not only do these amenities help residents of communities, but they can bring identity to communities by having an easily identifiable style of public use buildings. Existing sprawled neighborhoods may have a difficult time

[23] Ellen Dunham-Jones and June Williamson, Retrofitting Suburbia: Urban Design solutions for redesigning suburbs. Hoboken, NJ: John Wiley and Sons 2009. 18

introducing civic buildings because the population is not typically high enough without increasing to population density. One civic amenity that is sometimes sprawled outside cities for the purpose of cheap land is schools. Retrofitting a neighborhood adjacent to an existing school can help create a civic identity for the neighborhood. The existence of civic buildings can make suburbs attractive sites to transform into stronger communities.

Changing building codes is another goal of the Charter for the New Urbanism. Existing building codes often have zoning in Greenfield sites pre-zoned for residential development. Offering graphic representation of a new model for building codes where opportunities such as mixed use can become a legal form of development is essential to show that functional alternatives to current building codes are possible to employ. Changing building codes for a region is not a simple task however. Elected officials committed to changing existing policies will have to be elected and change laws while they will likely be opposed by residents or developers of a region that are satisfied with the current building policies.

Green space is another important element to a New Urbanist neighborhood. The charter explains that a variety of park spaces should be disbursed throughout a community. By having park spaces, residents will have points of interest in the community and spaces to hold events. Creating parks can be a positive influence on communities, but the issue of ownership makes creating parks difficult. Question about the spaces is “who will own these spaces?” the land in an existing neighborhood is valuable because residents have already paid to own a piece of it. Funding for maintenance of such spaces also becomes an issue. Since many suburban neighborhoods lie outside the jurisdiction of well-organized local branches of government, the community may have to be proactive in either privately managing the community or incorporating the new community into a separate governing body. With public spaces, it is imperative to have organized maintenance. Finding a governing body willing to inherit the responsibility is a test of viability.

In addition to public green spaces, natural, undisturbed areas are also called for to define area between neighborhoods. The issue with preserving land between neighborhoods is legally preventing development between can be difficult to implement. This requires change in policy that will result in something like an urban growth boundary which cannot by developed past until certain conditions are met. Creating such restrictions relies on governing bodies' willingness to endorse such regulations. Public support is also needed for such regulations.

Public use is stressed in New Urbanist neighborhood designs. Streets and public spaces are urged to be created in a manner that clearly distinguishes them as public spaces. As for residential neighborhoods that have sprawled from a city, public use may be something residents are intentionally avoiding by living in such areas. If it is true that residents of existing neighborhoods strongly value privacy from the public, there needs to be a solution to integrate private living areas in a public community to ensure that the residents of a development do not move and relocate the issues of sprawl to other locations.

New Urbanists also believe that communities should have identifiable styles to be blended to the rest of the community. This rule is generally unenforceable without special building codes being enforced in the area. This requires at the very least, the community to be recognized by a separate zoning circumstance from a regional government. At most it requires a new local government with a predetermined image of the community to create and enforce a strict city ordinance.New Urbanists also believe that communities should have identifiable styles to be blended to the rest of the community. This rule is generally unenforceable without special building codes being enforced in the area. This requires at the very least, the community to be recognized by a separate zoning circumstance from a regional government. At most it requires a new local government with a predetermined image of the community to create and enforce a strict city ordinance. The creation of a proactive governing body in support of

New Urbanist building models is essential for continuity in new communities establishing identity.

Safety is a major concern with creating new developments. Attractive features such as Le Corbusier's open space planning in modern housing tower developments are not viable unless accessibility and openness are present. Neighborhoods that are carefully planned will have minimum areas in which crime is likely to occur. The greater amount of area that can be self-policed will make fewer opportunities for crime to exist. Government will have to step in and clearly define what special requirements new architectural projects need to promote safe areas, where chances of crime occurring are small.

What the Congress for New Urbanism recognizes is that a sensible design solution is necessary to evolve existing urban design models for the better. The automobile still exists and is heavily relied on by a majority of American households. Automobile accommodation must be included in communities. Parking and vehicular circulation remains in New Urbanist design agenda, but should yield to pedestrian and public spaces. This concept is especially valuable to today's society. Most households have an automobile and most will continue to use one. Therefore it is valid to avoid isolation from the vehicular population just as it is valid to avoid isolation from a pedestrian population. In regards to how a community caters to today's needs, pedestrian spaces hold a capital value to each member of the community. With world peak oil having occurred in 2005[24], gas prices will continue to rise and the economic viability to drive an automobile will be reduced. Unlike existing suburban neighborhoods far from the city, the walkable New Urbanist community plan would support pedestrian and public transit use. A resident could give up the life of being a regular driver and still have access to essential amenities and public transportation system. The biggest drawback is that with less space available for parking to promote walkability, developers would likely have to pay extra money for parking spaces. With the

[24] Energy Information Administration, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 2007 Annual Report, DOE/EIA-0216(2007) February 2009

estimate cost of an at-grade parking space costing $1,000 + land costs, a parking garage space costing $10,000-$12,000 + land, and a sub-grade parking space costing $20,000 to $20,000 + land (RC 51), it is understandable that developers cannot afford to accommodate the automobiles in dense areas compared to areas where cheap land is readily available for parking. If the New Urbanist form is to be followed in as many as possible areas, an incentive laden or shared parking system needs to be available to attract developers. Otherwise developers may not be able to afford sufficient parking and cannot invest in a New Urbanist community.

Local identity is urged to be celebrated in the Charter for the New Urbanism. Topography, historic building styles, climate, etc. should all be considered in architectural designs under the charter. This requirement is another ambiguous set of guidelines left to be determined by governing bodies. Suburban neighborhoods, however, have relatively no local identity separate from the cities in which they are derived from. Looking to the nearby city could inspire local building styles in a New Urbanist neighborhood retrofitting.

The issue of in-building sustainability is included in the Charter for the New Urbanism to require individual buildings to design according to site. This means the inclusion of sustainable strategies such as passive heating and cooling are to be considered. While energy consumption and pollution is a growing concern to society, it is a separate issue from community design. To ask all developments to practice sustainability systems while also abiding to a number of design regulations may be unreasonable. To promote the idea of including of sustainable systems is noble, but the enforcement of a sustainable code is a separate issue than the goal of creating communities. The long list of sustainable requirements in New Urbanist guidelines may be difficult for developers to follow.

The concluding goal of the Charter of the New Urbanism is to preserve and restore historical buildings and landscapes. The constant renewal of urban forms within historical context is the natural evolution or urbanism. The goal of

creating a better urban form based on a residential suburban neighborhood is in line with this concept. The phase of suburban sprawl is one that was initiated post WWII when middle class households became able to buy single family homes on new land near cities they once lived. Suburban forms have continued to grow since then until they developed into what is referred to today as suburban sprawl. Along the way, they created a new set of urban design issues. Retrofitting such neighborhoods is nothing more than offering an evolved form of urban design that is more relevant today than the previous models of growth in existence.

The New Urbanist model of community design is a well-established program and the largest independent organization with specific design criteria to their development standards. Issues such as transportation, health, and public satisfaction are taken carefully into consideration as a design criterion is presented to improve all aspects of the community. It is difficult to argue that multiple functions and transportation methods are important in a community. However, the process for achieving necessary amenities considering financial and political obstacles is unclear. Restrictions become even more intense on an existing site where an established urban system needs to be changed. The scope of the study provides viable and data supported information on possible strategies to achieve a sensible solution to retrofitting a residential neighborhood for growth with a new urban design model such as New Urbanism.

For a New Urbanist community model to become a reality, public and political support is required. The need for the public to accept alternative design solutions is especially relevant in areas where a community is already in existence. Residents of these communities have invested in the area for a reason, and it is not likely that an alteration to what they rightfully purchased and own to be immediately accepted. Areas struggling to attract a consistent base of residents may be the easiest place for an urban retrofit. If it is evident that a change in design is needed for a community to be successful, concepts to improve the area would likely be more accepted than in a community where

residents are generally satisfied with their community. Presenting a design alternative to an owned area of land will require an acceptance that the future development will improve the investments made in the area by local residents. Factors regarding what the general population desires in a residential area must be closely studied and taken into consideration in future development. One of the biggest gaps in the Congress for New Urbanism is that there seems to be minimal strategies to gain public support and little stress on maintaining desirable qualities of suburbs that originally attracted its residents. Although infill development is encouraged, there is no existing formula to successfully re-develop within existing communities.

A proactive governing body needs to be involved after a new neighborhood model is accepted and developed. If a regional government accepts bids to change land use and allow New Urbanist style developments to occur, the existing governing body must be willing to enforce the New Urbanist principles. If there is not a governmental interest to maintain alternative design strategies such as New Urbanism, the task may by deferred to private developers to that have no interest in managing a community. Another alternative is for an area to secede from regional government. Such was the case in Wildwood, MO, a suburb of St. Louis. The area was having difficulty getting the types of developments it wanted approved, so it held a vote with 61% of the population choosing to re-incorporate with a new governing body[25].

A hardship of forming a new government for an area is the majority of the population has to support change in a given region. To reach out and educate the majority of a population requires a funded, well-articulated message to reach the public by means of any and all media. Suggestions for gaining public support need to be provided and proactive supporters must emerge to help shape the new government.

[25] Jonathan Barnett, Redesigning Cities, Chicago, IL: Planners Press, 2003. 2

Steps concerned citizens or developers need to take to allow New Urbanist policies must be readily available for governments to make a change. If the information is not organized and ready to reference, it is less likely to be researched and embraced. Duany, Plater-Zyberk, and Speck admit in the New Urbanist book *Suburban Nation,* that "the issues at stake are quite complex, and that the path of reason may not always be clear. In such situations, it may be best to simply remember this refrain:

No more housing subdivisions!

No more office parks!

No more highways!

Neighborhoods or nothing! [26]

Ideally, the issues should not appear as complex to the general public. Because the advocacy for citizens to stop supporting sprawling developments is needed, reasoning why and how to actually prevent housing subdivisions, office parks, and highways needs to be explained to the public. This way, citizens can contribute to solving the issues of sprawling developments rather than simply saying, "no more…!" if the opposition of urban sprawl is valid, it is valid for the public to be aware of it and it is valid that the public be given strategies to fight sprawl.

Government Help: Environmental Protection Agency's Smart Growth Program

In response to the increased concern suburban sprawl has on the environment, the United States government's Environmental Protection Agency

[26] Andres Duany, Elizabeth Plater-Zyberk, and Jeff Speck, Suburban Nation: The Rise of Sprawl and the Decline of the American Dream, New York: North Point Press, 2001. 243

(EPA) became involved in the fight against sprawl. The program created, named Smart Growth, set to study the ways in which sprawling development is detrimental to the environment and society and to create guidelines to enhanced development practices. Smart Growth has ten distinct principles that can be applied to developments such as retrofitting strategies for residential neighborhoods[27].

1. Mix Land Uses

As described in the Charter for the New Urbanism, mixed land use is necessary because people require a variety of spaces. Offering mixed land uses allows different uses such as homes, commercial retail, and office workspace to be located near each other, thus severing a reliance on a distant city in a sprawled situation. In theory, this is a simple and required step to making a community independent from nearby cities. In actuality, mixed use is outlawed in the majority of area through current zoning practices. Single use zoning is often written into the majority of city design policies. To change an area to a mixed use zone requires lobbying to the appropriate governing body for a change in policy. Public opposition can also occur and the battle to allow mixed use may ultimately be decided by a vote between elected officials or the public. The process takes support and effort. For developers to wait through such a long and vigorous process, developing in an area without as many obstacles in policy may have more appeal to invest in time and money into.

2. Take Advantage of Compact Building Design

Being able to design more compactly will result in higher densities. The higher densities rise will, in theory, save land from being developed on

[27] Smart Growth Online: “Principles of Smart Growth” The Smart Growth Network. www.smartgrowth.org/about/principles/default.asp

undisturbed, natural sites. This is important for the preservation of natural spaces. While it may be less of an obstacle near city cores, in suburbia it is a principle that directly defiles the design criteria of sprawling residential neighborhoods. Sprawled neighborhoods are usually placed on a substantial plot of land with lots consisting of one family living in a relatively large home. The low population density and availability of personal land may be attracting features for residents to live in such neighborhoods. If it is possible to design spaces for these types of investors that maintain the private and spacious qualities associated with low density housing, it should be expressed and accommodated in an alternative urban design.

3. Create a Range of Housing Opportunities and Choices

By including spaces for different income levels, poor families can benefit from the community. It also avoids a concentration of the poor in an unfavorable environment. Assurance needs to be provided to residence that low income housing does not necessarily mean an increase of crime in the area. Crime associated with the poor, and often poor minorities, is generally concentrated to poverty stricken areas where less than 25% of poor Caucasians, half of poor Hispanics, and 75% of poor African Americans reside. The rest of the poor population is already disbursed throughout the metropolitan areas in working class neighborhoods[28]. Just by having poor families in the community does not have to mean an increase of crime. The poor exist in many working class neighborhoods and can be an integral part of a well-functioning society.

4. Create Walkable Neighborhoods

Not only is independence from the automobiles greatly needed in a community by members who are unable to drive, but providing walkable space

[28] Jonathan Barnett, Redesigning Cities, Chicago, IL: Planners Press, 2003. 63

promotes healthy living where exercise and human interaction occur during trips. Not only will using automobiles take away these experiences, but it also is a source of air pollution and financial burden, especially with gas prices rising steadily. Walkable neighborhoods require the planning of destinations to walk to. Many suburbs have walkable sidewalk that are good for exercise, but are not functional as a transportation corridor. To have a neighborhood be walkable as a transportation method, park space, retail, or other types of public amenities need to be introduced. The introduction of new spaces requires space to be sacrificed in existing residential neighborhoods. The proposed space needs to be sensible to gain the general support of the local public.

5. Foster Distinctive, Attractive Communities with a Strong Sense of Place

The inclusion of a specific style suited especially for an area is to occur to ensure every community builds a unique character. The unique character of a neighborhoods is often a good way to distinguish itself to attract new residents and development. This discourages developers from using “cookie cutter” strategies to create multiple similar buildings that can be constructed quickly for a profit, a practice that is done commonly in residential development and can result in developments may look exactly alike.

6. Preserve Open Space, Farmland, Natural Beauty, and Critical Environmental Areas

This principle is suggesting that greenfield development must be minimized. This supports justification that redesigning existing developed areas is needed to help slow the negative effects of suburban sprawl. The preservation of the open spaces can be reinforced by the inclusion of a growth boundaries or tax incentives to deter from greenfield development.

7. Strengthen and Direct Development toward Existing Communities

This aspect is the focal point of the study and of Smart Growth in general, to create a feasible development within an existing residential community. By abiding to this principle, preserving open spaces is also achieved. Means to go about developing an existing community, however, holds many challenges to overcome opposed to greenfield development, where development limitations are less constrictive. For these reasons, providing a smart growth community may be simpler by developing greenfield sites. The issue then arises that providing an alternative community to sprawling neighborhoods by creating a new community sprawling onto greenfield sites fails to preserve natural land and prevent suburban sprawl.

8. Provide a variety of Transportation Choices

When a variety of transportation options are available, two major benefits can occur. One is that a broader range of people are able to operate within the community. Non-driving residents could be able to enjoy the amenities of the community by walking, biking, or using public transit systems to work, shop, and play in an area close to home that is inaccessible in solely residential neighborhoods. The other byproduct of offering more transit options is it may become viable for residents relying on an automobile to use alternative transportation methods. If amenities are close, walking and biking becomes more realistic to frequent users of automobiles. This will achieve a healthier environment by keeping more cars and their consumption of fossil fuels off of roads.

9. Make Development Decisions Predictable, Fair, and Cost Effective

A sensible design strategy for a community is important to maintain the support of the residents. Predictable changes will ensure that investors in a

community will not be overtaken by an unprecedented urban model. Cost effectiveness is essential due to the fact that smart growth communities have requirements that greenfield developments do not typically have. To achieve attainability for developers, a way for developers to invest a similar amount of funds as a greenfield project must be available. An issue with achieving predictability within the retrofitting of residential neighborhoods is that changes to existing development models are anything but predictable. Residents of suburbs did not invest in mixed use living spaces oriented to transit options; they invested in a spacey plot of land away from organized urban spaces that is oriented to access highways. To introduce different uses to *their* land, a certain amount of support by the residents is needed, which is not easy to obtain. The support of residence may require preservation of aspects that caused residents to invest in a suburban environment originally. If a design compromise can be developed and accepted by an existing community, public support can allow a community to be developed into a smart growth model.

10. Encourage Community and Stakeholder Collaboration in Development Decisions

The principles of Smart Growth are well-intentioned and justified. However, if there is no governing body ensuring the management of a smart growth community, it runs the risk of having sprawled developments form from its new community core. At the very least, regional government needs to be able to handle development issues that arise in a smart growth community, but it may be better for members of the community to be proactive in future development and maintenance issues. If member of a community are able to control how development will unfold, it keeps issues away from broader branches of government that may enforce policies that are counter-productive to what a community is trying to achieve.

Smart Growth principles have a strong backing as to why they are important to a community. The EPA gathers an abundance of research materials and studies to support the validity of the concept. Since it is a government funded organization, its funding allows it to fund what is endorses to an extent. In 2009, three major grants were given for smart growth development including one to the Congress of New Urbanism[29]. Smart growth can be used as a tool to design communities better and is staffed and available to help.

Parking: Requirements and Strategies

An action that must occur in order to alleviate vehicular presence and improve walkability in a community is diverting from the current parking paradigm. According to the SmartCode V 9.2, the focus of the study area will lie within the T-3 Urban Zone, which is defined as Sub-Urban Zone[30].

Within the T-3 area, a number of different residential forms can be found. According to Sprawl Repair Smartcode Module prepared by Duany Plater-Zyberk & Co, three types of primary suburban settings can be found. Type S-3 is a rural area with developed housing directly along local roads. Type S-4 is single family subdivision, with a common lack of block structure. Type S-5 is a denser type of housing suburb that allows multi-family housing on each site. Although the

[29] The Smart Growth Network. “2009 Grants Winners” smartgrowth.org
[30] Duany Plater-Zyberk & Co., “SmartCode Module V9.2” 2008. 56

information of this study can relate and be beneficial to each residential suburban setting, the focus of the study is on S-4 communities.

Typical suburban homes of S-4 districts include “McMansions” and front loaded houses[31]. Parking structures and how individual housing lots are conformed break apart pedestrian flow of a residential community and fail to create points of interest along a path of travel. For instance, most of these types of homes include a private driveway which often leads to a private garage. Private garages offer little interaction to the public other than having to cope with the portion of driveways becoming vehicular paths when owners come and go. A street-facing, two car garage takes up at least 20 linear feet of street space. This may not seem like much for a passerby on foot to overlook. However, over an extended walk, the amount of sidewalk, driveways, and garages becomes one of the major components of a walk in suburbia. If a person passes 30 homes on a walk, he/she potentially crosses 600 feet of private garages and driveways. This distance is equal to the size of two football fields of non-public area. To change the repetitive anti-social orientation defined by private parking, home owners must have an incentive to change layouts into a more pedestrian friendly alternative.

Mixed use is essential to transform “bedroom communities” into entities that can operate without reliance on nearby cities. Pedestrians require destinations to live, work, and play. Through the set standards of parking, introduction of public amenities to a community proves to be another difficult barrier in successful retrofitting. Presenting a variety of opportunities and amenities within a community requires commercial or civic development to satisfy need within the community. Aside from developing in a manner different from local zoning on owned land, the demand for parking to support new developments creates another issue.

[31] Duany Plater-Zyberk & Co., “SmartCode Module V9.2” 2008. 13

For example, below is a small residential community in Rochester Hills, MI, a sprawling suburb of Detroit.

Image provided by Google/NASA

The neighborhood measures roughly 43 acres (1,875,000 square feet) and each of the 137 homes sits on roughly a quarter of an acre of land. The goal of this study is to provide an alternative to greenfield development, therefore at-grade land is at a premium. For the purpose of studying parking, it is assumed that the regional density is high enough to support the following changes. If a 5,000 square foot office building is added, typical parking requirements by local codes and permanent lenders would call for 20 parking spaces[32]. These 20 parking spaces would require about 350-4—square feet each (including vehicular circulation) and could potentially use 8,000 square feet of land[33]. This amount of parking needed accounts for nearly an entire ¼ acre home lot and surpasses the footprint of the office building. Looking at the neighborhood as a whole, the office building would only require less than 1% of the total area. If a few more public

[32] Duany Plater-Zyberk & Co., "SmartCode Module V9.2" 2008. 51
[33] Duany Plater-Zyberk & Co., "SmartCode Module V9.2" 2008. 51

amenities are added however, a trend can be seen in the value of land becoming more valuable.

To provide different housing options, some higher density apartments could be added. Using Duany Plater-Zyberk & Co's Sprawl Repair Module's suggestion of a minimum of 10% multi-family housing units[34] and the United States Census Bureau's 2008 average household size number of 2.70 in owner occupied units and 2.42 in renter occupied units, it can be suggested that at least 16 apartment units should be added. These 16 units according to typical codes require 1 ½ - 2 parking spaces each. Therefore, require parking can require up to 12,800 square feet, which is nearly 1% of the total community area. Changing 10% of the area to commercial spaces (general retail, restaurant, etc.) would require an additional 938 spaces and up to 375,200 square feet of parking would be required.

The theoretical change in the sprawling community replaced roughly 11% of the area of the existing community divided among existing infrastructure, green space, and homes. The required parking, however, calls for an additional 21% of the existing land. The impact of the re-development could potentially claim 32% of the existing neighborhood, or 600,000 square feet. According to the numbers, such a renovation could cause at least 55 of the 137 homes to be relocated, which could create strong disapproval by the current community. Viability could be accepted if the neighborhood is particularly affected by an economic downturn and much of the land and homes lie vacant, and depreciate nearby real estate investments. In such a case, residents could recognize that a change must be made to improve the area and welcome developers to retrofit the community. Because of current parking requirements, the pressure of keeping development footprints down is an issue.

Jonathan Barnet summarizes a tactic often used by capitol driven developers when determining a site for new development:

[34] Duany Plater-Zyberk & Co., "Sprawl Repair SmartCode Module V9.2" 2008. 5

"The moral of the story: a good way to gain a price advantage for office development is to buy cheap land with good access and get it rezoned for offices. Then the developer has enough room to build at grade parking, which provides a big price advantage over a developer who has a build a garage." [35]

This logic demonstrates that building in an area where ample greenfield or open land does not exist is more difficult for the developer to profit. With potentially high costs to develop require parking, it is difficult to argue otherwise. The cost is increased in a suburban retrofit since development is taking place on owned land. Owners of properties to be acquired will seek a return on investment making developed land more expensive than a greenfield site. Acquiring owned land takes more time and effort to purchase than undeveloped land that typically has a single owner and is a substantial area.

The theoretical introduction of 10% commercial establishments within the Rochester Hills neighborhood demonstrates the advantage of finding a new development site without as many issues. At-grade parking, which will require 21% of the area of 29 of the 137 homes, costing $1,000 per space excluding the cost of land or landscaping, would cost developers $1,278,000[36]. This number inflates when homes will have to be purchased and demolished in order to make room for parking. In the Rochester Hills study, density of the area would have to be increased, which requires redesigning residential sites to support additional population. In order to be successful, developers must overcome the following obstacles:

1) Negotiating reasonable land prices for large blocks of residential plots

2) Compensate / be part of a plan that compensates for significant residential land sacrificed to new developments and parking

[35] Jonathan Barnett, Redesigning Cities, Chicago, IL: Planners Press, 2003. 52
[36] Jonathan Barnett, Redesigning Cities, Chicago, IL: Planners Press, 2003. 51

A simple alternative to solve the issue of parking lots overtaking at-grade land is to develop above or sub-grade parking. Even if a return on investment can be predicted, steep upfront costs to developers can deter their interest. Profit from developing inexpensive greenfield sites can come quickly due to lower upfront costs. The average costs of a parking space with construction of a garage costs $10,000 to $12,000 plus land or pro rata share of land[37]. A benefit of having to purchase fewer plots of land to dedicate to parking is present as well as fewer costs to acquire and demolish residential units. Looking at the Rochester Hills study, the total cost for garage parking without the inclusion of land costs, can jump from $1,278,000 to $15,336,000. However, benefits of constructing a garage alleviate the need to purchase more land and create higher densities, and support pedestrian activity. With parking garages, buildings can be closer together which promotes pedestrian traffic. Also, if 1278 required parking spaces for a development are organized into average 2-story garages, the land required for parking decreases by half and if average of 3-story garages are constructed for all parking requirements, only 18 homes would have to be relocated within the community oppose to 55. The more parking spaces arranged vertically in parking garages, the less residential relocation will have to occur. Developers must overcome these obstacles for constructing a parking garage in a residential neighborhood:

1) Pay 1000%-1200% of at-grade parking in upfront parking costs

2) Negotiating reasonable land prices for acquiring residential plots

3) Compensate/be part of a plan that compensates for some residential land sacrificed to new developments and parking

Another alternative to preserve at-grade land is to eliminate parking at-grade. Parking would have to be below green space, underneath, or on top developments. In theory, sub-grade parking does not require the footprint of at-grade of garage parking. However, sub-grade parking can be difficult to fund.

[37] Jonathan Barnett, Redesigning Cities, Chicago, IL: Planners Press, 2003. 51

Cost can range $20,000 to $30,000 per sub-grade parking space[38]. In the case of the Rochester Hills study, the total cost of sub-grade parking could cost as much as $38,340,000. The obstacles developers face to provide sub-grade parking are as follows:

1) Pay 2000% to 3000% of at-grade parking costs upfront

2) Negotiate and purchase few sites for additional parking if necessary

3) Compensate for minimal residential land if necessary

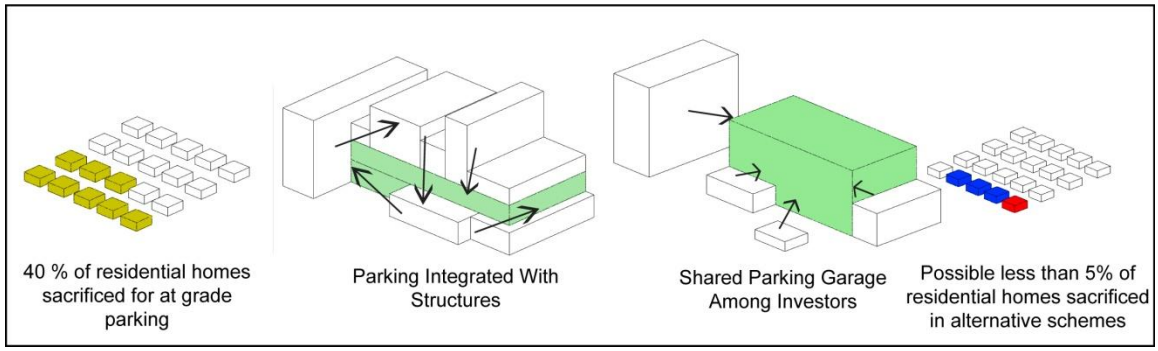
There are also ways to reduce the amount of required parking that large scale re-developments require. In offices within suburbs such as office parks, 4, or arguably 3 parking spaces[39], are generally required for every 1,000 sq.ft. of office space. If mass transit is nearby, however, the number can be significantly reduced. An office in a city with a rapid transit system generally requires only 2.5 cars per 1000 square feet of office space[40]. If a city has a metropolitan transit system, meaning it reaches the suburbs, only 0-1.5 cars per 1000 square feet are required[41]. With mass transit introduced to an area, required parking could potentially be cut in half. Mass transit is not usually viable for suburban settings, though, because population is not concentrated enough to justify operating in the area. Use would likely be low because residents of suburbia are reliant of automobiles. Because of low density neighborhoods in suburbia, mass transit would have to travel great distances for few riders, likely becoming expensive to operate.

In conclusion, many opportunities can present themselves as viable investments for developers with proper policy structure beforehand. Possible scenarios create alternative parking include the following:

[38] Jonathan Barnett, Redesigning Cities, Chicago, IL: Planners Press, 2003. 51
[39] Duany Plater-Zyberk & Co., “SmartCode Module V9.2” 2008. 35
[40] Jonathan Barnett, Redesigning Cities, Chicago, IL: Planners Press, 2003. 51
[41] Jonathan Barnett, Redesigning Cities, Chicago, IL: Planners Press, 2003. 51

1) Encourage shared parking between individual developments.

Encouraging different building uses within shared parking garages can be an efficient tactic to achieve lower upfront costs for parking garages, as it reduces the overall size and cost of such parking structures. For example, office buildings with standard work hours will generally use parking facilities from 8:00 a.m. to 5:00 p.m., with restaurants and entertainment businesses generating large crowds after 5:00 p.m. A policy that could stimulate the development of compact parking would be to require developers to provide multi-level parking when developed land is being razed for parking purposes. In the Rochester Hills study, building new parking structures at least five-stories high is predicted to reduce the demolition of 40% of residential homes needed to create at-grade-level parking when a neighborhood is introduced with a 10% commercial area growth.

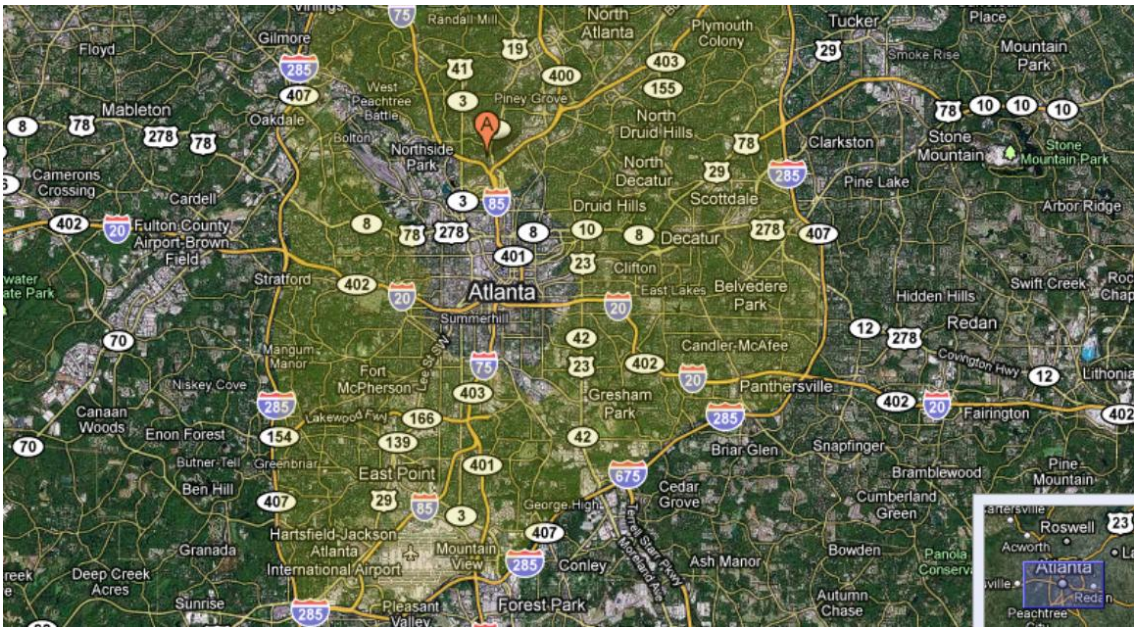


The diagram above represents alternatives to at-grade parking. On the left, the yellow squares represent the 40% of residential homes that would have to be razed to make way for at-grade parking in the Rochester Hills study. The next image to the right demonstrates how a cluster of developments can integrate parking within new developments' footprints to conserve land. This strategy can provide multiple spaces and parking in a single development without the expense of sub-grade parking. To reduce financial burden, multiple parties may be involved in a single development. All parties would need to agree on architectural plans and accept joint responsibility in the project. Although it may be the best solution for parking, the risk to investors could be too great to gain support.

The next solution to the right shows individual businesses sharing a parking garage to decrease the amount of at-grade parking and alleviate some cost by sharing expenses to construct a garage. The blocks at the far right represent potential homes razed for parking garages in the Rochester Hills study. With two-story parking garages, 80% of the homes could be preserved. With an average of three-story parking garage, 93% of the homes could be preserved.

2) Develop in a method to make mass transit a viable option for the community.

Providing mass transit will not only provide transportation options, but can also reduce the hardships of developing parking in areas where land value has been increased by as much as 50%. A decrease in parking will save land, deconstruction, and construction costs. Developing in first-ring suburbs that are close to existing public transit options can provide the possibility of incorporating transportation options in an adjacent urban core. Slightly altering or adding new connection routes at the edge of a primary urban center can be a viable starting point to introduce mass transit further from a city.



3) Use economic downturn as viable time to re-develop

New developments requiring large footprints can use a desperate economy to attain land below market price. Vacant homes created through

foreclosure may be purchased from mortgage lenders who are not properly suited for property management. The reduction of vacant homes in the area will raise the value of the community. Support for re-development may grow easier in a community that is depreciating in value and containing concerned citizens. The re-development of vacant homes can also reduce crime as much as 4.2% for every 450 feet of diametric zone free of vacant homes[42].

Marketing Data: The Retrofit Formula

The need for new public amenities within residential neighborhoods is essential for the community to function without absolute reliance on a nearby city. A specific and well thought general plan must be developed, to ensure that a community grows to enrich residential areas, while creating successful commercial developments. The viability of a particular development being placed within a suburban setting relies on multiple economic factors that must be considered for a successful retrofit.

The most important commercial element to any consumer is sources of food and water, for survival. According to marketing data for 2010, grocery stores are a public amenity that is used by 99.1% of the national population[43]. The United States Census Bureau estimates that in 2010, the national population will be at 310.2 million. By 2030, the population is expected to rise to 373.5 million, an increase of 20%[44]. With the expected population increase, the supermarket business is expected to grow, with sales increasing by 109.42 billion annual sale dollars[45] (excluding inflation factors). In addition to supermarkets, other grocers' food sales are estimated to rise an additional 89.62 billion annual sale dollars (excluding inflation factors)-- bringing the total estimated increase of home grocery sale items to 1.194 trillion, with an increase of nearly 200 billion annual

[42] Temple University Center for Public Policy and Eastern Pennsylvania Organizing Project. "Blight Free Philadelphia: a Public-Private Strategy to Create and Enhance Neighborhood Value." Philadelphia, 2001.
[43] Joseph Agnese, Industry Surveys: Supermarkets & Drugstores., New York, NY: Standard & Poor's, 2010. 22
[44] United States Census Bureau, American Community Survey, 2008
[45] Joseph Agnese, Industry Surveys: Supermarkets & Drugstores., New York, NY: Standard & Poor's, 2010. 9

sale dollars. Not only is the demand for grocery sales at nearly 100% of the population, but the stability of the industry and estimated growth of the business, due to population growth, makes grocery stores among the most viable amenities to introduce to an area.

The term “supermarket” refers to conventional supermarkets including: chains such as Kroger and Safeway, superstore combos such as Wal-Mart or Meijer’s, and limited assortment stores with less than 15,000 items. The term “grocery store” refers to the latter, in addition to convenience stores that do not sell gasoline such as 7-Eleven, superette convenience stores, and wholesale club stores such as Sam’s Club and Costco.

Although they are an essential community resource, the cost to run a grocery store requires an average of 98.1% of total sales. The remaining average 1.9% profit accounted for just 18.9 billion dollars in the U.S. in 2008. Maintaining an average of 1.9% profit margin within supermarkets is the basis for a theoretical introduction of a grocery store to make a profit. Grocery stores must be appropriately sized to support a regional population and create a net profit margin. It is important to know the target profit for each individual business to determine the proper amount of people required regionally to make the business profitable.

The following formula can be used to determine the total amount of people required to net the average of 1.9 % of total sales for an average 22,720 sq. ft. grocery store[46]. The total series of formulas is referred to as the Retrofit Formula.

A) For total population required to support

$$\frac{\textit{Annual Sales}}{(\textit{Trips per Shopper per year} * x)\ (\$\ \textit{per trip Spent})}$$

[46] Joseph Agnese, Industry Surveys: Supermarkets & Drugstores., New York, NY: Standard & Poor’s, 2010. 16

x = percentage of trips per year spent at nearest establishment

B) For total household units needed:

Result A / Average Household size

C) To determine density to support an average type of establishment:

C1) Sufficient with local density within walking Distance

*(Л *Maximum walking distance² - Building footprint) / A [or B for household]*

C2) Sufficient with local density using average commute distance to development

*(Л *average commute distance² - Building footprint) / A [or B for household]*

C3) Sufficient with maximum commute for region

*(Л *Maximum commute distance² - Building footprint) / A [or B for household]*

C4) Sufficient with other methods of transit

*(Л *average/desired commute distance² - Building footprint) / A [or B for household]*

Using various data sources, the different average population densities required can be calculated. From the 2008 Progressive Grocer's Annual Report of the Grocery Industry, average annual sales needed, with an average 1.9% profit ratio in an average 22,720 sq. ft. grocery store are $13,457,163. The amount of trips shoppers make to a single grocery store is a variable that can change according to different locations. The average number of trips a shopper makes to purchase groceries annually is 54.8[47]. Given this number, the amount of people needed to support a store can be estimated. Using the average amount spent per trip in a grocery store, $29.15[48], formula A would factor out as below.

1a)

x = 100% of shopper's annual trips

$$\frac{\$13,457,163}{(54.8 \text{ trips} * 1)\ (\$29.15)} = 8,424 \text{ people}$$

[47] Joseph Agnese, Industry Surveys: Supermarkets & Drugstores., New York, NY: Standard & Poor's, 2010. 22

[48] Joseph Agnese, Industry Surveys: Supermarkets & Drugstores., New York, NY: Standard & Poor's, 2010. 20

1b)

x= 50% of shopper's annual trips

$$\frac{\$13,457,163}{(54.8 \text{ trips} * .5)\ (\$29.15)} = 16,871 \text{ people}$$

1c)

x= 25% of shopper's annual trips

$$\frac{\$13,457,163}{(54.8 \text{ trips} * .25)\ (\$29.15)} = 33,697 \text{ people}$$

1d)

x= 10% of shopper's annual trips

$$\frac{\$13,457,163}{(54.8 \text{ trips} * .1)\ (\$29.15)} = 84,243 \text{ people}$$

After selecting a site, market trends can be analyzed in similar context to help select how often an average person might shop at the proposed grocery store. To demonstrate the formula, variable 1c will be used. This means that it is estimated that the local population willing to commute to the proposed grocery store will shop there an average of 25% of the time.

To determine the area sufficient to support the grocery store in a region, the number should be calculated using the region's ratio of owner-occupied units

and renter-occupied units. The respective numbers should then be divided by the United States Census Bureau's average household size of 2.7 for owner-owned dwellings, and 2.42 for renter-occupied dwellings[49], then added together. The total number of households counted from the grocery store will create a radial distance. If the distance is comparative to distances of other successful grocery stores, the organization is sufficient. Most likely, however, population density will need to be increased to support a large store, especially in a low-density residential setting.

To determine the proper population density required to support a grocery store, a number of factors and design scenarios have to be considered. For example C1, the desired development can be supported by shoppers within a walkable distance. The term walkable distance is subjective and must be designated in design criteria. Joel Garreau, author of *Edge City*, has determined that 600 feet is the maximum distance a pedestrian is willing to walk instead of driving. Smart Growth figures claim up to 1,500feet is considered a comfortable walking environment. Using the longer, 1,500 foot walk theory, the figure will result as the following:

*C1) (л * 1,500 feet² - 22,720) / 33,697 people*

= .0048 people per square foot or 637.6 people per square mile

The resulting population density required is found based on the theory that local residents will shop at the developed grocery store 25% of the time and will be within a walkable distance. C2 can be found by finding an average distance commuters travel to competitive establishments in the area. C3 can be found by finding the maximum distance shoppers are willing to commute to shop at a given store.

[49] United States Census Bureau, American Community Survey, 2008.

After finding section C, population density, there are two possible results. An area will have appropriate population density to support the new development, or it will be inadequate. If an existing residential region is not sufficient to fulfill design requirements, two methods can be used to compensate. One option is to change the density of the area. Increasing density by means of introducing apartments, townhouses, etc. is a viable option that is often used by groups such as New Urbanists to create sufficient population to support public amenities. The other option is to scale the building type to a smaller version to support the existing population density.

Testing the Retrofit Formula

The location to test the new theory is Hill View Superette in Bridgeport, CT. The site was selected because of its proximity to local sprawling conditions and is scaled to an appropriate size for the area. Using marketing information for the location, the new theory can be tested on a development that has started introducing small commercial pieces to primary residential neighborhoods. The image below is an image of the community adjacent to Hill View Superette. There are roughly 1650 homes in an area slightly less than one square mile.

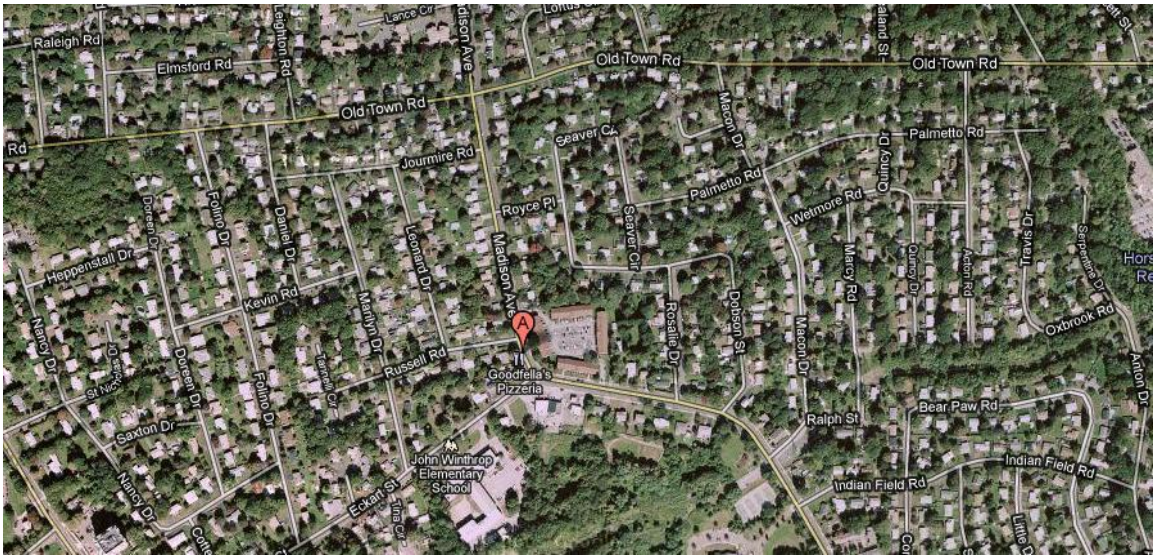


Image from NASA / Google

A) For total population required to support[50]

Annual Sales [1,729,000]

*(54.8 Trips per Shopper per year * .25) ($29.15 per trip Spent)*[51]

x = percentage of trips per year spent at nearest grocery store

(Assume an average of 25% of total shopping trips verified through surveys or membership records)

= 4329 people needed to support

[50] ReferenceUSA, US Businesses Database. 2010 Infogroup, Inc.
[51] Joseph Agnese, Industry Surveys: Supermarkets & Drugstores., New York, NY: Standard & Poor's, 2010. 24

B) For total household units needed: (The 1sq. mi area has roughly 1650 households)

Result A [4,329 people]/ Average Household size [2.7][52]

=1603 households (Sprawling community area is consistent with marketing data)

C) To determine density to support average type of establishment:

C2 is used because the existing area appears to be oriented by the automobile and walking distances for the community exceed 1,500 feet

C2) Sufficient with local density following average commute distance

*(Л *average commute distance [approx. 3.2 mi] ² - Building footprint [5,000ft²]) / A [20,606 people] [or B for household]*

= 20,606 Sq. Ft. / person

This means that population density will be this number if 25% of shoppers are willing to travel up to the national average commute time. The 1650 homes all lie within 1 sq. mi, therefore the minimum density requirement is met

[52]United States Census Bureau, American Community Survey, 2008

I.) Total dollars saved to average consumer from new amenity

(*Average trips to similar [54.8] * X* Average trip time [0.21hours][53] * Average hourly wage [18.96][54] * 2 [to and from store]*

=$109.10

+

*((Average trips to similar [54.8] * X*Average trip distance (3.2 miles[55]) / average miles per gallon [24.6]) * Average gas price [2.82.9][56])*

** 2 [to and from store]*

=$10.05

= Total amount of dollars saved by community member

=$119.15

(Excluding traffic and stress factors)

II.) Total distance less traveled

*Average Household size [2.7] * Total number of households defined in region B [1603] * average trips to similar [54.8] * average distance to similar [3.2] * x [.25] * 2*

[53] Cheryl Brown and Borisova, Tatiana, Understanding Commuting and Grocery Shopping Using the American Time Use Survey. Washington, DC 2007
[54] United States Bureu of Labor and Statistics, Establishment Data: Earning. Washington, DC 2010
[55] Cheryl Brown and Borisova, Tatiana, Understanding Commuting and Grocery Shopping Using the American Time Use Survey. Washington, DC 2007
[56] U.S. Energy Information Administration, Monthly Energy Review April 2010

= total distance less traveled by community [632.32 miles]

III.) Estimated contribution to community annually in dollars

*Average household size [2.7] * number of households in defined region B [1603] * I. [$119.15]*

= Total amount of dollars contributed to community [$515,323.75]

(Excluding property values)

From testing the Retrofit Formula, it is evident that the accuracy of market projections is correct and meets minimum density guidelines. From that point, it can be determined to what degree the superette has on the sprawling community. By shopping at the nearby superette 25% of the total number of shopping trips per year, the time and gasoline saved is only about 100 dollars per person. By multiplying the number by the total amount of residents within the community, it is evident that a substantial payback to the community is achieved. In this situation, the superette is saving the nearby community roughly over $500,000 per year in time and money.

Using the Retrofit Formula with Different Business Types

The developed formula can work for all types of programs to introduce to the suburban setting. One of the strengths of the design formula is that it can test building types relatively quickly, as long as the general statistics and marketing data is available for the types of additive programs. If a scale of program or density is not feasible, it is not an ideal development to add to the community.

To change the type of program introduced, the following variables are changed in the formula: annual sales, trips per shopper/worker/visitor per year, average dollars spent per visit, average commute distance, and building area.

Retail stores have a variety of markets that can be projected into the formula based on size of building, profit, and typical size of the store. General sizing information necessary to complete the new design equation is organized on the following pages. The tables provided by Standard and Poor's determine the ideal square footage for each type of retail store as well as the primary trade area and profits.

SHOPPING CENTER DEFINITIONS

TYPE	CONCEPT	SQUARE FEET	ACREAGE	NUMBER OF ANCHOR STORES	TYPE OF ANCHOR STORES	ANCHOR RATIO*	PRIMARY TRADE AREA**
MALLS							
Regional center	General merchandise; fashion (mall, typically enclosed)	400,000 – 800,000	40–100	2 or more	Full-line department store; jr. department store; mass merchant; discount department store; fashion apparel	50–70%	5–15 miles
Super-regional center	Similar to regional center, but has more variety and assortment	800,000+	60–120	3 or more	Full-line department store; jr. department store; mass merchant; fashion apparel	50–70%	5–25 miles
OPEN-AIR CENTERS							
Strip/convenience center	Convenience stores and service outlets, a narrow mix of goods and personal services to a very limited trade area	less than 30,000	less than 3	1 or none	Convenience store/mini-mart	N/A	less than 1 mile
Neighborhood center	Convenience	30,000 – 150,001	3–16	2 or more	Supermarket	30–50%	4 miles
Community center	General merchandise; convenience	100,000 – 350,000	10–40	2 or more	Discount department store; supermarket; drug; home improvement; large specialty/discount apparel	40–60%	3–6 miles
Lifestyle center	Upscale specialty stores; dining and entertainment in outdoor setting	150,000 – 500,000	10–40	0 to 2	Not usually anchored, but may include large-format bookstore, multiplex cinema, small department stores, and other big box outlets	0–50%	8–12 miles
Power center	Category-dominant anchors; few small tenants	250,000 – 600,000	25–80	3 or more	Category killer; home improvement; discount department store; warehouse club; off-price retailers	75–90%	5–10 miles
Theme/festival center	Leisure; tourist-oriented; retail and service	80,000 – 250,000	5–20	N/A	Restaurants; entertainment	N/A	N/A
Outlet center	Manufacturers' outlet stores	50,000 – 400,000	10–50	N/A	Manufacturers' outlet stores	N/A	25–75 miles

*The share of a center's total square footage attributable to its anchors. **Area from which 60%– 80% of the center's sales originate. N/A-Not applicable.
Source: International Council of Shopping Centers.

	1998	R2006	R2007	R2008	% CHG. 2007-08	10-YEAR GROWTH RATE†
Retail trade	2,587.1	3,869.5	3,994.8	3,960.0	(0.9)	4.3
GAFO, total*	759.1	1,116.9	1,154.2	1,155.7	0.1	4.3
Automotive group	689.7	896.4	906.9	792.9	(12.6)	1.4
Furniture & appliance group	152.3	224.6	227.2	216.6	(4.7)	3.6
Building materials, garden equip. & supplies	202.7	344.1	335.5	323.3	(3.6)	4.8
Food group	417.4	533.8	559.6	587.7	5.0	3.5
Liquor stores	25.5	36.7	38.8	41.3	6.3	4.9
Health & personal care stores	129.7	224.0	236.4	245.8	4.0	6.6
Gasoline service stations	191.9	412.6	437.0	478.9	9.6	9.6
Apparel group	149.4	213.3	221.1	216.0	(2.3)	3.8
Men's clothing stores	10.2	9.8	10.0	9.5	(5.0)	(0.7)
Women's clothing stores	28.4	38.7	39.3	37.8	(3.9)	2.9
Family clothing stores	50.2	81.4	84.2	83.2	(1.1)	5.2
Shoe stores	22.3	26.8	26.7	26.8	0.6	1.9
Sporting goods, hobby, book, & music stores	68.9	84.5	86.9	87.7	0.9	2.4
General merchandise group	351.2	552.6	577.0	596.0	3.3	5.4
Department stores	223.3	213.3	209.7	200.0	(4.6)	(1.1)
Other general merchandise stores	127.9	339.3	367.3	396.0	7.8	12.0
Miscellaneous retail stores	99.8	114.3	117.4	117.5	0.1	1.7
Nonstore retailers	134.1	269.2	289.8	297.6	2.7	8.3

R-Revised. *GAFO consists of the General Merchandise, Apparel, Furniture & Appliance, Sporting & Hobby, and Misc. Retail groups. †Computed by Standard & Poor's.
Source: US Department of Commerce.

Office spaces have slightly different considerations when determining how many people it takes to make successful. Because offices are generally not open to the physical public, the workers are considered the primary consumers. A general rule of thumb states that 250 square feet are required for each employee and a parking stall must be present for each worker[57]. The amount of space required to contain enough required parking is the main challenge in introducing a building with no public use. The number of offices basically correlate to demand. It is not exceptionally beneficial to add them into a retrofit unless they are incorporated within another development that benefits the local community. Feasibility is also related to the overall cost to the development to include office space. Below is a chart for the average costs of construction of office spaces.

[57] Jonathan Barnett, *Redesigning Cities*, Chicago, IL: Planners Press, 2003. 51

U.S. DOLLARS PER SQUARE FOOT CONSTRUCTION COSTS – BY TYPE OF STRUCTURE – FEBRUARY 2008

MAJOR CITIES (alphabetically)	OFFICE BUILDING (2 TO 4 STORIES)			OFFICE BUILDING (5 TO 10 STORIES)		
	2008	2007	% Change	2008	2007	% Change
1 ATLANTA	$136.95	$131.87	3.9%	$128.17	$123.95	3.4%
2 BALTIMORE	140.93	136.88	3.0%	131.89	128.67	2.5%
3 BOSTON	177.92	170.22	4.5%	166.51	160.00	4.1%
4 CHICAGO	175.32	167.12	4.9%	164.08	157.09	4.4%
5 CLEVELAND	152.85	148.39	3.0%	143.05	139.48	2.6%
6 DALLAS	129.31	123.90	4.4%	121.02	116.47	3.9%
7 DENVER	143.83	140.27	2.5%	134.61	131.86	2.1%
8 DETROIT	158.81	154.88	2.5%	148.63	145.58	2.1%
9 HOUSTON	134.20	130.54	2.8%	125.60	122.71	2.4%
10 KANSAS CITY	156.52	152.07	2.9%	146.48	142.95	2.5%
11 LOS ANGELES	165.54	157.83	4.9%	154.92	148.36	4.4%
12 MIAMI	136.65	128.03	6.7%	127.89	120.35	6.3%
13 MINNEAPOLIS	170.43	165.64	2.9%	159.50	155.70	2.4%
14 NEW ORLEANS	133.29	127.74	4.3%	124.74	120.07	3.9%
15 NEW YORK CITY	200.69	193.08	3.9%	187.82	181.49	3.5%
16 PHILADELPHIA	176.08	168.59	4.4%	164.79	158.48	4.0%
17 PHOENIX	136.19	131.72	3.4%	127.46	123.81	2.9%
18 PITTSBURGH	150.86	145.88	3.4%	141.19	137.12	3.0%
19 PORTLAND	157.13	150.75	4.2%	147.06	141.70	3.8%
20 ST. LOUIS	158.05	153.25	3.1%	147.91	144.06	2.7%
21 SAN DIEGO	161.10	153.84	4.7%	150.77	144.61	4.3%
22 SAN FRANCISCO	188.31	179.66	4.8%	176.24	168.88	4.4%
23 SEATTLE	158.35	153.55	3.1%	148.20	144.33	2.7%
24 WASHINGTON, DC	151.47	144.70	4.7%	141.76	136.02	4.2%
25 WINSTON-SALEM	119.83	116.67	2.7%	112.15	109.67	2.3%

MAJOR CITIES (alphabetically)	OFFICE BUILDING (11 TO 20 STORIES)			MEDICAL OFFICE BUILDING		
	2008	2007	% Change	2008	2007	% Change
1 ATLANTA	$118.76	$110.27	7.7%	$154.52	$149.39	3.4%
2 BALTIMORE	122.21	114.47	6.8%	159.00	155.07	2.5%
3 BOSTON	154.29	142.35	8.4%	200.73	192.83	4.1%
4 CHICAGO	152.03	139.76	8.8%	197.80	189.32	4.5%
5 CLEVELAND	132.55	124.09	6.8%	172.45	168.10	2.6%
6 DALLAS	112.14	103.61	8.2%	145.89	140.36	3.9%
7 DENVER	124.73	117.31	6.3%	162.28	158.91	2.1%
8 DETROIT	137.72	129.52	6.3%	179.18	175.46	2.1%
9 HOUSTON	116.38	109.16	6.6%	151.41	147.88	2.4%
10 KANSAS CITY	135.73	127.17	6.7%	176.59	172.28	2.5%
11 LOS ANGELES	143.55	131.98	8.8%	186.76	178.80	4.5%
12 MIAMI	118.50	107.07	10.7%	154.17	145.04	6.3%
13 MINNEAPOLIS	147.79	138.52	6.7%	192.28	187.65	2.5%
14 NEW ORLEANS	115.58	106.82	8.2%	150.38	144.71	3.9%
15 NEW YORK CITY	174.04	161.47	7.8%	226.43	218.73	3.5%
16 PHILADELPHIA	152.70	140.99	8.3%	198.66	191.00	4.0%
17 PHOENIX	118.10	110.15	7.2%	153.65	149.22	3.0%
18 PITTSBURGH	130.83	121.99	7.2%	170.21	165.26	3.0%
19 PORTLAND	136.26	126.06	8.1%	177.28	170.78	3.8%
20 ST. LOUIS	137.06	128.16	6.9%	178.31	173.62	2.7%
21 SAN DIEGO	139.71	128.65	8.6%	181.76	174.29	4.3%
22 SAN FRANCISCO	163.30	150.24	8.7%	212.46	203.53	4.4%
23 SEATTLE	137.32	128.41	6.9%	178.66	173.95	2.7%
24 WASHINGTON, DC	131.36	121.01	8.6%	170.90	163.93	4.3%
25 WINSTON-SALEM	103.92	97.57	6.5%	135.20	132.18	2.3%

Data source: Reed Construction Data – RSMeans/Charts: Reed Construction Data – CanaData.

These charts and tables were abstracted from RSMeans cost data publications for the A/E/C industry. For more information about RSMeans Square Foot Cost Guide and RSMeans CCI (Construction Cost Index), which indexes square foot costs for cities in the U.S. and Canada, visit the online bookstore at www.rsmeans.com and click on cost data publications (or call 1-800-448-8182).

Scaling Developments Appropriately

Since the total profit and number of people needed to sustain a large development such as a grocery store is not always available, it is possible to

scale the square footage of the grocery store down until the adjacent or proposed population has the capacity to support the public amenity. Reducing the size of a proposed grocery store will reduce the population density required for funding until a desirable size is found for the target population of a region. Through the theory that scaling buildings will not affect relative success, it is possible to require groceries, and other stores, to build in factored sizes. The factored sizes can be influenced by the adjacent population and the distance to the nearest competitive establishment. Using the process to attain the population density in C1, average income, square footage, and total usage factors can be altered to determine ideal scenarios for sizing and location that amenities have the chance to be most successful.

For example, according to the Retrofit Formula, a 100,000 square foot grocery store requires 5,000 people within a 3.2 mile range for vehicular commuters to operate. If there are only 2,500 people within the 3.2 mile range, the store should be downsized to a 50,000 square feet. Scaling can occur as long as the ratio between density and scale of development is maintained and the development can function properly at a different scale. The opposite strategy can be used as well. The amount of people living in the 3.2 mile range can be increased to 5,000 to be able to support the scale of the new development.

Issues conforming to the Retrofit Formula can be overpowered by the potential benefits for a community. Utilization of such a policy, however, requires support from the public. In any circumstance of using the Retrofit Formula, policy must allow varieties of densities and uses, which is not always possible. The message of the Retrofit Formula must become public knowledge so that community investors, as a whole, understand the potential benefits of using the new system so that communities have the necessary tools to evolve into more efficient models.

Although the Retrofit Formula can be used when it is not employed as an enforced governing policy, the principles to allow such a re-development must still be passed in policy. A body governing a potential area of re-development is

required to allow a variety of different uses. Areas that do not allow mixed use planning in their respective communities still require the lobbying for change in government policy to use the Retrofit Formula accordingly. Communities that are primarily residential, but allow mixed-use development, are optimum areas for the Retrofit Formula to be used. Mo‘ili‘ili, within the Honolulu urban center, is an example of such a design criteria, where multiple uses and densities are permitted, but growth does not fully embrace the development freedom.

Architectural Guidelines

Through the statistical-based approach to planning communities for re-development, developments of proper size are suggested to be introduced to the area. The developments that are to be introduced to an area, however, require the employment of proper architectural guidelines in order for the developments to function cohesively with the re-development plan. In many cases, an increase in density is required to place points of interest near each other to promote pedestrian traffic. Issues such as increasing density or increasing pedestrian routes require architecture to co-operate with the changes. Developing a set of architectural guidelines can help buildings adhere to the intentions of re-development plans and achieve the goals of a project.

Developing tailor-made architectural guidelines for this re-development effort seemed at one time paramount. Guidelines were determined in a fashion that displayed neutrality between homeowners and developers. To ensure that architectural guidelines were as fair to both developers and homeowners as possible, they were created with as little subjectivity as possible. This was made possible by basing architectural guidelines on statistical research. By using varied forms of research, results were quantified into how they should be reflected in suburban re-development. A trend that began to develop was a resemblance of many guidelines to existing codes. Some of the codes are essential to include into existing bodies of knowledge however and will be

described in section h. The remainder of the architectural codes developed are located in Appendix E.

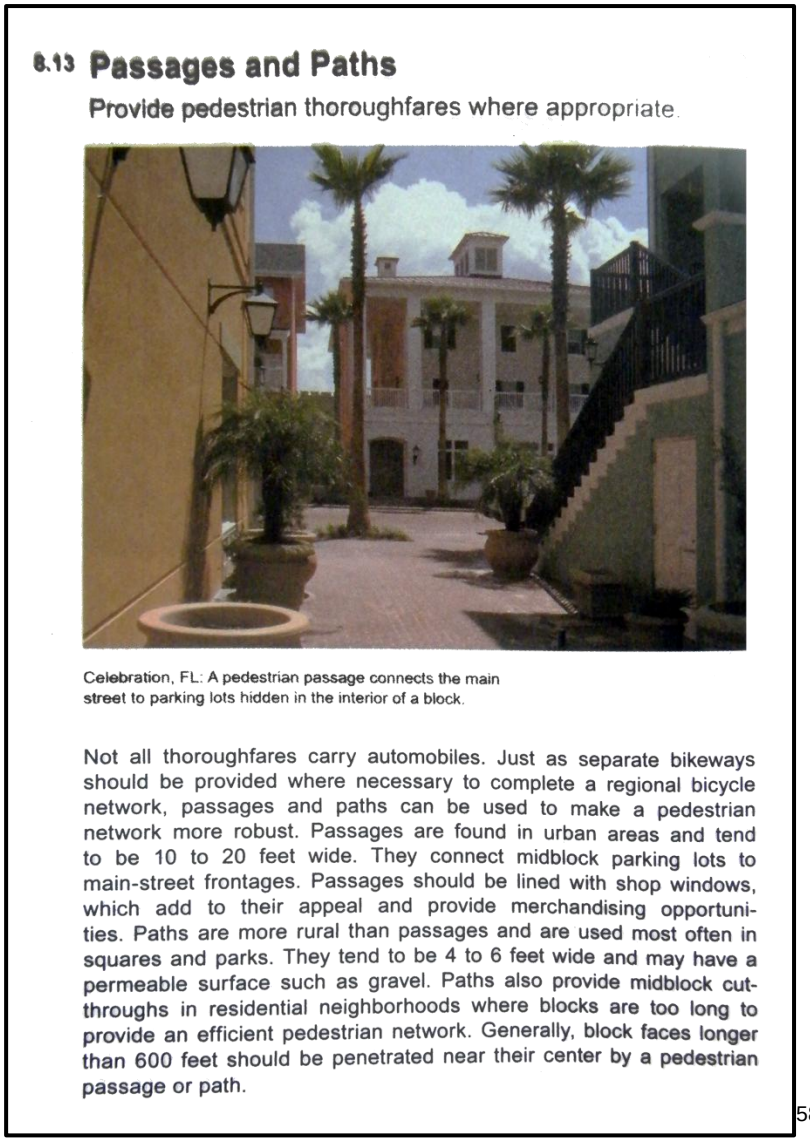
There has been a tremendous effort that has been made by numerous organizations to help develop architectural guidelines for similar re-development efforts. The ability of this thesis to work with the research created by its precedents can be an advantage. Valid architectural codes and guidelines can be used to influence the outcome of re-developments that employ the development standards developed herein. The following architectural guidelines can be followed to influence the mixed use communities desired through re-development.

Smart Growth Standards

The theories and concepts of smart growth have been outlined earlier in this document. Smart Growth advocates have developed standard criteria to match the communal design that they have created. What Smart Growth can provide to a project is a strong set of principles of what and how buildings should be developed for maximum benefit to communities. Third-party writings have clarified the concepts of Smart Growth to be employed as building codes or architectural guidelines. One such book that exemplifies this statement is *The Smart Growth Manual* written by Andres Duany and Jeff Speck, with Mike Lydon. The authors have partially been responsible for the creation of New Urbanism. Their labors in promoting Smart Growth shows that efforts to promote mixed-use developments in communities is a collaborative effort and that research done by one group is beneficial to the other. Such is the case for this study.

The Smart Growth Manual can provide a re-development with a long and detailed list of suggestions communities can try to accomplish. As described earlier in this document, Smart Growth is not a strict code, but a subjective list of community goals that do not always provide techniques to achieve. The Smart Growth Manual takes the demands of Smart Growth further by breaking down

the criteria of smart growth and assigning a number to each guideline. Each guideline is explained and exemplified in a one-page format.



8.13 **Passages and Paths**

Provide pedestrian thoroughfares where appropriate.

Celebration, FL: A pedestrian passage connects the main street to parking lots hidden in the interior of a block.

Not all thoroughfares carry automobiles. Just as separate bikeways should be provided where necessary to complete a regional bicycle network, passages and paths can be used to make a pedestrian network more robust. Passages are found in urban areas and tend to be 10 to 20 feet wide. They connect midblock parking lots to main-street frontages. Passages should be lined with shop windows, which add to their appeal and provide merchandising opportunities. Paths are more rural than passages and are used most often in squares and parks. They tend to be 4 to 6 feet wide and may have a permeable surface such as gravel. Paths also provide midblock cut-throughs in residential neighborhoods where blocks are too long to provide an efficient pedestrian network. Generally, block faces longer than 600 feet should be penetrated near their center by a pedestrian passage or path.

[58]

The above example shows how Smart Growth principles are explained in *The Smart Growth Manual*. While the guidelines of Smart Growth can certainly provide guidance to re-development projects, the inability to translate to all situations makes many of the rules not possible. Also, the guidelines are open to interpretation. 13.4: Energy-Efficient Design is an example of such ambiguity. The guideline explains how energy efficient design benefits the building and the

[58] Andres Duany, Jeff Speck, Mike Lydon. *The Smart Growth Manual.* New York: McGraw Hill, 2010. pg8.13

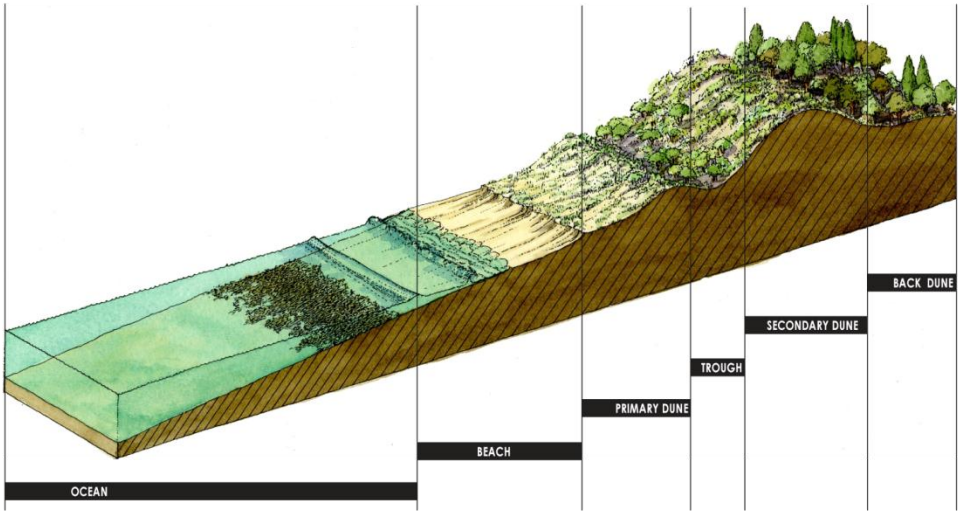
environment, but does not specify what qualifies as an energy efficient building or provide suggestions on where to apply the rule. What Smart Growth lacks can be found in other mixed use research efforts.

New Urbanist Standards

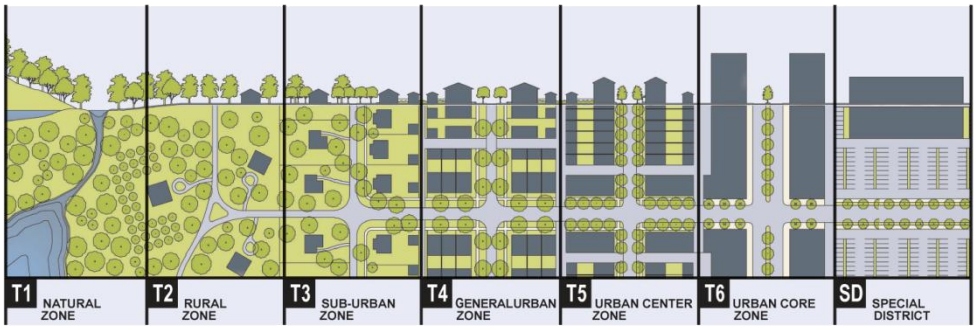
Also covered earlier, New Urbanism can provide guidance to re-development projects. New Urbanism provides a set of guidelines similar to Smart Growth. The demands of New Urbanism are more detailed than Smart Growth, but do not cover as wide of range of design guidelines. New Urbanists focus on guiding the form of communities to their desired mixed use standards. The Charter for the New Urbanism provides all of the standards set by the organization. To aid the process of re-development, some of the leaders of New Urbanism have developed a set of form-based codes to help them achieve their desired community, as well as Smart Growth principles. The set of codes is called *Smart Code*, which is supplemented by a series of modules such as sprawl repair, architectural, and transit oriented development.

Form Based Codes: Smart Code

Smart Code provides technical guidelines to planning and architecture that is proposed in Smart Growth and New Urbanist demands. The concept which bases codes on form are organized in a series of transects. It is argued that different transects are a natural occurrence with different components and needs. The comparison is applied to urban form. Each transect or the urban form is described and referenced for each code that is proposed. Based on which transect the proposed development is categorized under, the code will suggest a different intervention. An example of the categorization of transects is shown below, followed by an example of a Smart Code's form based code.



A Typical Natural Transect [59]



A Typical Rural-Urban Transect, with Transect Zones [60]

[59] DPZ & Co. *Smart Code V9.2*. The Town Paper Publisher, 2009 pgvi
[60] DPZ & Co. *Smart Code V9.2*. The Town Paper Publisher, 2009 pgvii

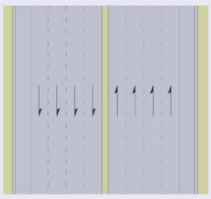
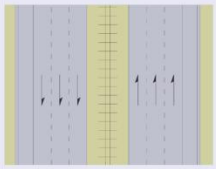
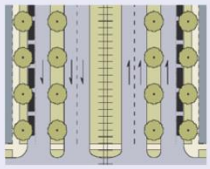
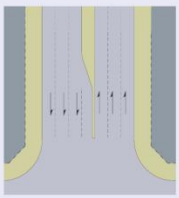
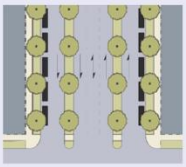
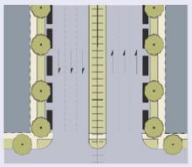
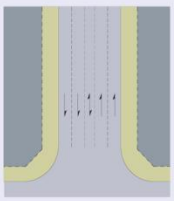
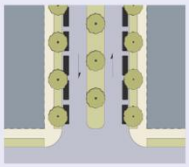
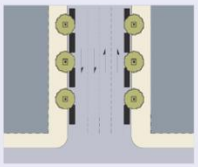
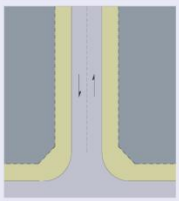
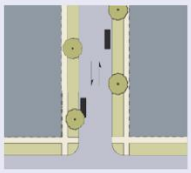
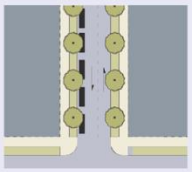
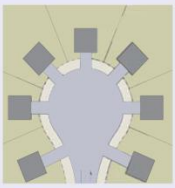
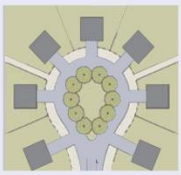
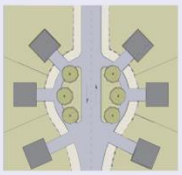
SMARTCODE MODULE

SPRAWL REPAIR

Municipality

Author: Duany Plater-Zyberk & Co. Draft: June 8, 2009

TABLE SR4: Thoroughfare Types Repaired. This table provides descriptions of the necessary tools to repair the Sprawl Thoroughfare Types into Complete Streets.

SPRAWL TYPES		TECHNIQUES	COMPLETE STREETS			
FREEWAY		• Reduce number of lanes • Reduce Curb Radii • Reduce lane width • Introduce Access Lanes • Introduce parallel parking • Introduce transit - light rail or Bus Rapid Transit • Introduce separated bikeways • Assemble Public Frontages according to T-zones	PARKWAY	T2 T3 	BOULEVARD	T4 T5 
ARTERIAL		• Reduce Curb Radii • Reduce lane widths • Introduce Access Lanes • Introduce parallel parking • Introduce medians • Introduce transit • Introduce separated bikeways • Assemble Public Frontages according to T-zones	BOULEVARD	T4 T5 T6 	AVENUE	T5 T6 
COLLECTOR		• Reduce number of lanes • Reduce Curb Radii • Reduce lane width • Introduce parallel or diagonal parking • Introduce medians • Assemble Public Frontages according to T-zones	AVENUE	T4 T5 	COMMERCIAL STREET	T5 T6 
LOCAL		• Reduce Curb Radii • Reduce lane widths • Introduce parallel parking • Eliminate turning lane • Assemble Public Frontages according to T-zones	ROAD / STREET	T3 T4 	STREET	T5 
CUL-DE-SAC		• Introduce a green Civic Space • Introduce pedestrian and bicycle Paths • Introduce new Thoroughfare connections where possible • Assemble Public Frontages according to T-zones	CLOSE	T3 	ROAD / STREET	T3 T4 

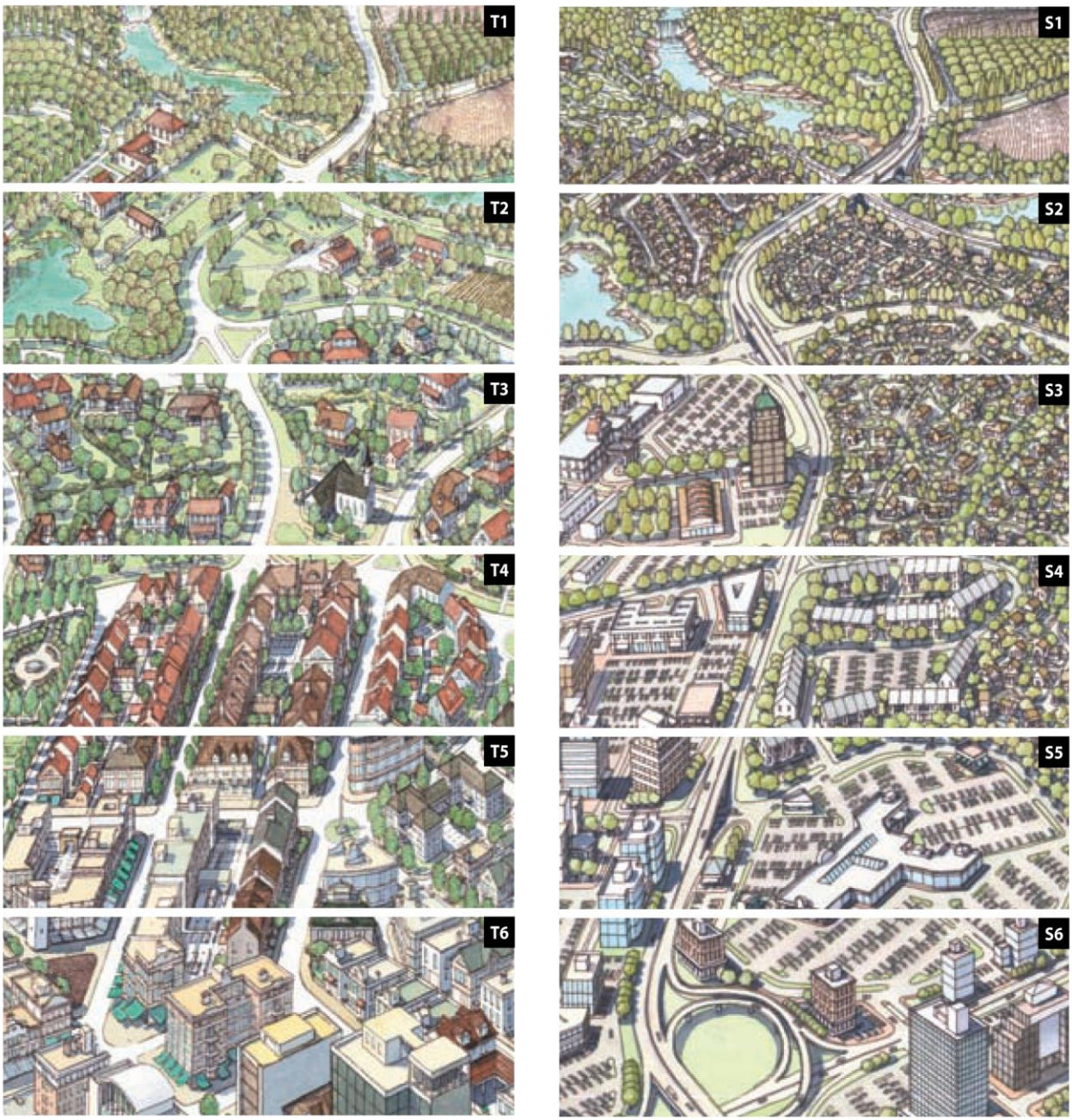
DRAFT

61

[61] DPZ & Co. *Sprawl Repair Smart Code Module*. The Town Paper Publisher, 2009 pgSC9

An example of the form based code regarding streets is shown above. Sprawl Repair Manual

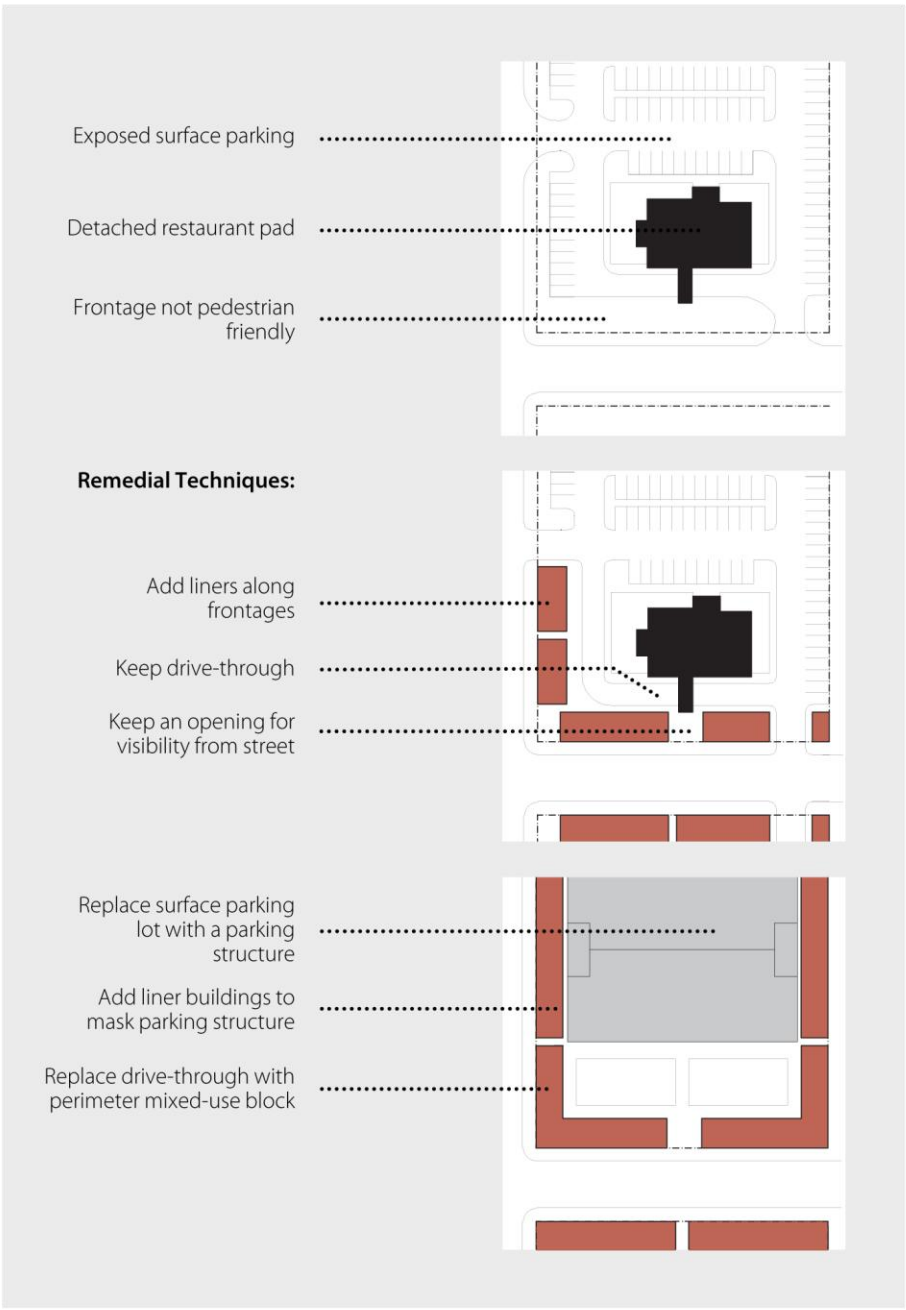
The *Sprawl Repair Manual*, written by Galina Tachieva, provides a list of improvements to repair communities affected by sprawl. The architectural guidelines are form based and provide methods to re-develop each component of areas influenced by urban sprawl. The codes provide strategies for re-developing everything from office parks, to shopping malls, to single family subdivisions. Samples of the type of transformation desired by the architectural guidelines are shown in the image below. The series on the right shows different regions that are typical to areas affected by urban sprawl. The series on the left shows the desired form for re-development. To follow Tachieva's architectural guidelines can provide strategies to retrofit sprawling neighborhoods and are applicable to this project.



62

To provide means to achieve the transformation from the “S” series to the “T” series of transects shown above, each arrangement of buildings shown in a sprawl setting is provided with a detailed solution for re-development.

[62] Galina Tachieva. *Sprawl Repair Manual.* Washington DC: Island Press,2010. pg30



63

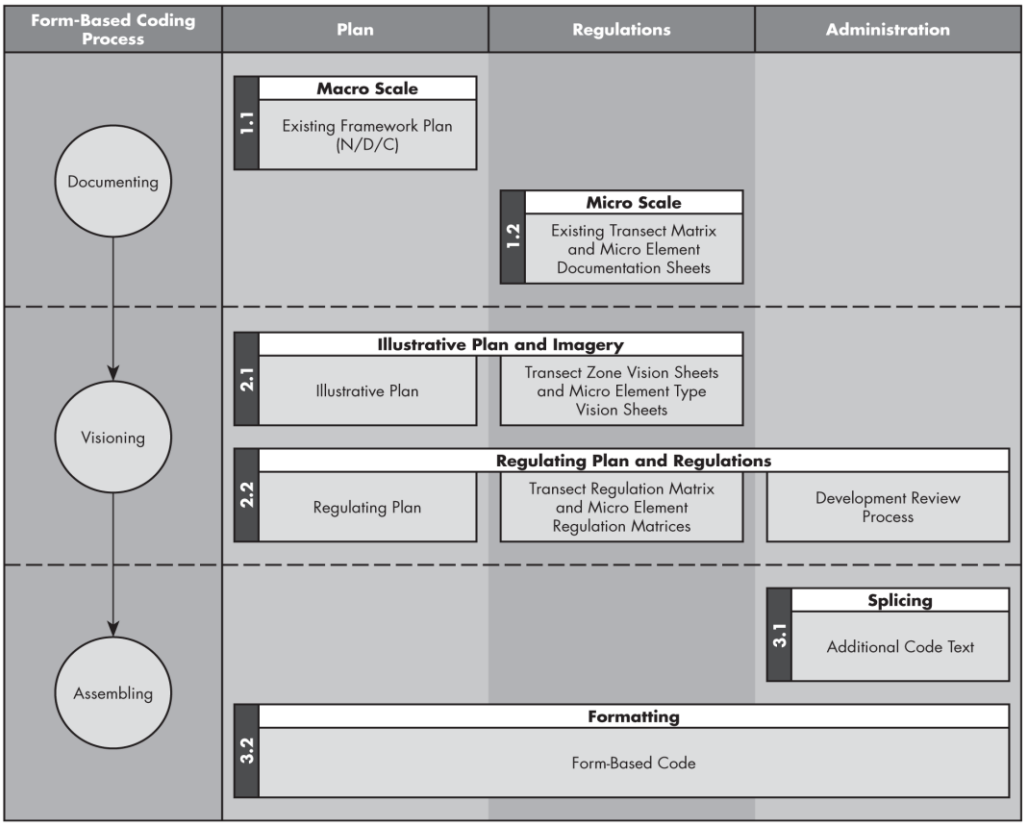
The above example shows how the architectural guidelines outlined by Tachieva can benefit re-development efforts. In this example, strategies are provided to show how a car oriented business type, such as a drive in restaurant, can be altered to support dense pedestrian oriented developments. Architectural

[63] Galina Tachieva. *Sprawl Repair Manual.* Washington DC: Island Press,2010. pg30

guidelines from the *Sprawl Repair Manual* provide a starting point for architectural design of building that are proposed in the planning phases of re-development.

Other Form Based Codes

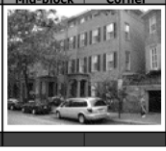
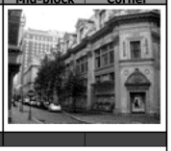
Establishing a set of form based codes that are unique to an area helps when determining the specific needs of each region. Form based codes have been employed increasingly from the early 2000's to 2010. Communities such as Montgomery, Alabama, Heart of Peoria, Illinois, and Sarasota, Florida are among the many areas that have adopted form based coding that is specific to their community. Opticos Design is a firm that has established itself as one of the leaders in writing form based codes. Two principals of the firm, Daniel G. Parolek and Karen Parolek describe how to use form based codes in a project in their book, *Form-Based Codes: A guide for Planners, Urban Designers, Municipalities, and Developers*. The book describes how to create and employ form based codes for various situations based on existing efforts.



[64]

The image above illustrates the process of developing form based codes that are unique to a project as described by Opticos Design. The desired outcome is a system of architectural standards for a project. Below shows an example of general standards to use when adopting or developing a set of form based codes. The codes can be used to influence building placement, architectural styles, building scale, public amenity placement and more. By employing existing form based codes, a prescriptive system to guide building design can be established in developments and re-development projects.

[64] Daniel G. Paralek, Karen Parolek, Paul Crawford. Form-Based Codes. Hoboken, NJ: John Wiley & Sons, 2008 pg96

	T3		T4		T5	
	Typical Mid-block	Typical Corner	Typical Mid-block	Typical Corner	Typical Mid-block	Typical Corner
FPO Images Only -->						
City						
Width of Largest Historic Building	120' Apartment Bldg					
Block						
Perimeter Length	1530'		1600'		1600'	
Length (Primary Street)	525'		400'		400'	
Depth (Secondary Street)	240'		400'		400'	
Shape	R		R		R	
On-street parking spaces within 1/4-mile radius	250		200		200	
Length of Building at Front BTL from Corner						
Left End of Block			80'		100'	
Right End of Block			100'		100'	
Building Placement						
Lot Size						
Width	45' - 50'	50' - 60'	25'	30'	75' - 125'	75' - 125'
Depth	110'	110'	100'	100'	100' - 150'	100' - 150'
Square Footage	5,500	6,600	2,500	3,000	12,500	12,500 sf
Distance From	P	P	P	P	P	P
Location of lot	M	C	M	C	M	C
If it is a corner lot, where does the building face?	—	P	—	P	—	P
Front (Main Body of Building)	15' - 20'	15' - 20'	5'	5'	0'	0'
Side Street (Main Body of Building)	—	15' - 20'	—	5'	—	0'
Left Side, Main Building	8'	8' - 10'	0'	0'	0'	0'
Right Side, Main Building						
Left Side, Ancillary Building	0' - 60'	0'	0'	0'	—	—
Right Side, Ancillary Building						
Rear, Main Building	40'	40'	40'	40'	—	—
Adjacent Use/Transect Level	T4	T4	T4 & T5	T4 & T5	—	—
Rear, Ancillary Building	6' - 8'	6' - 8'	6'	6'	—	—
Length of Building at Façade Line (BTL)						
Front	60% - 100%	50% - 80%	100%	100%	90% - 100%	90% - 100%
Side Street, Main Building	—	30% - 35%	—	70%	—	90% - 100%
Side Street, Ancillary Building	—	100%	—	70%	—	—
Width of Building/Lot Width (%)						
Front	55% - 55%	55% - 50%	100%	80% - 100%	80% - 100%	80% - 100%
Side Street	60%	60%	—	70%	—	80% - 100%
Miscellaneous						
Number of Buildings on Lot	2	2	2	2	1	1
Number of Main Buildings	1	1	1	1	1	1
Number of Ancillary Buildings	1	1	1	1	0	0
Distance between Main and Ancillary Buildings	25' - 30'	25' - 30'	20' - 30'	20' - 30'	—	—
Sidewalk Edge Treatment where there is not a Building	3' fence	3' fence	3' fence	3' fence	6' street wall	6' street wall
Treatment between Building and Sidewalk (if any)	lawn	lawn	hardscape	hardscape	—	—

[65]

e) Site Context

Ewa, on the island of Oahu, HI provides examples of typical sites where low density sprawling development has occurred and will likely continue.

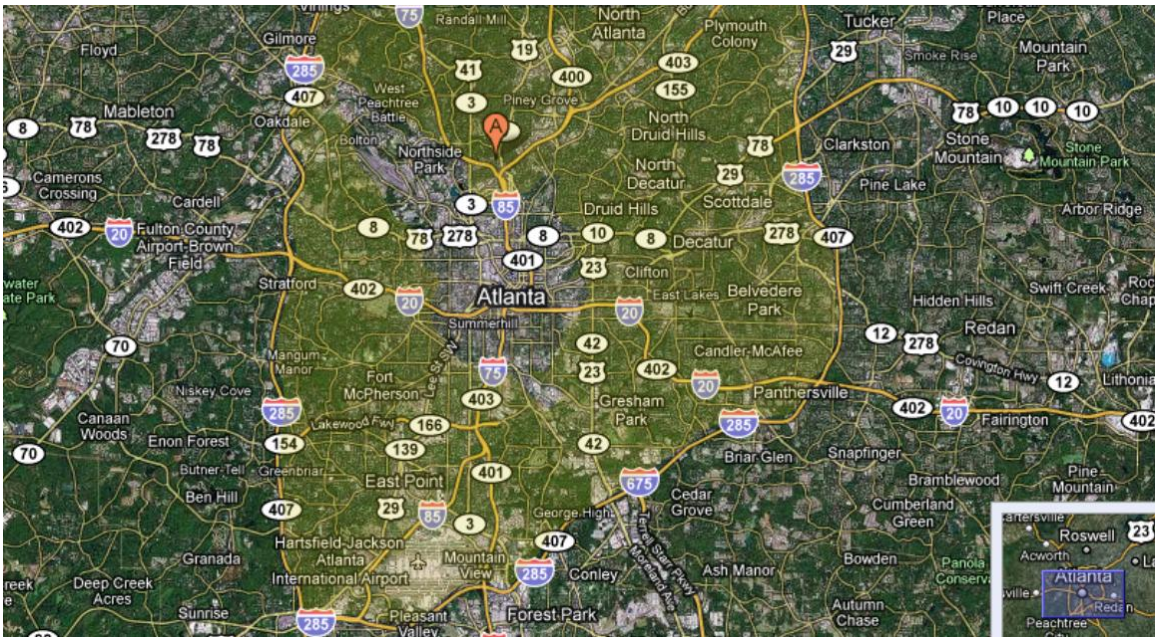
[65] Daniel G. Paralek, Karen Parolek, Paul Crawford. Form-Based Codes. Hoboken, NJ: John Wiley & Sons, 2008 pg134

Site # 1 is an existing circumstance where sprawled development has occurred. The site, highlighted in white on the following page, contains examples of both residential and commercial sprawl.

Site # 2 is undeveloped or agricultural land where sprawl is likely to continue to spread. The site will contain few obstructions for development and be located on the outskirts of a city. An example of such a site is highlighted in yellow.

Rather than continuing current development trends and expanding to site #2, the desired alternative neighborhood design interventions are to take place in site #1. This strategy aims to prevent suburban sprawl by directing new developments to areas that are already, but inefficiently developed.

Aerial View of Ewa, Oahu. Image provided by NASA



Aerial View of Atlanta, Georgia. Image provided by NASA

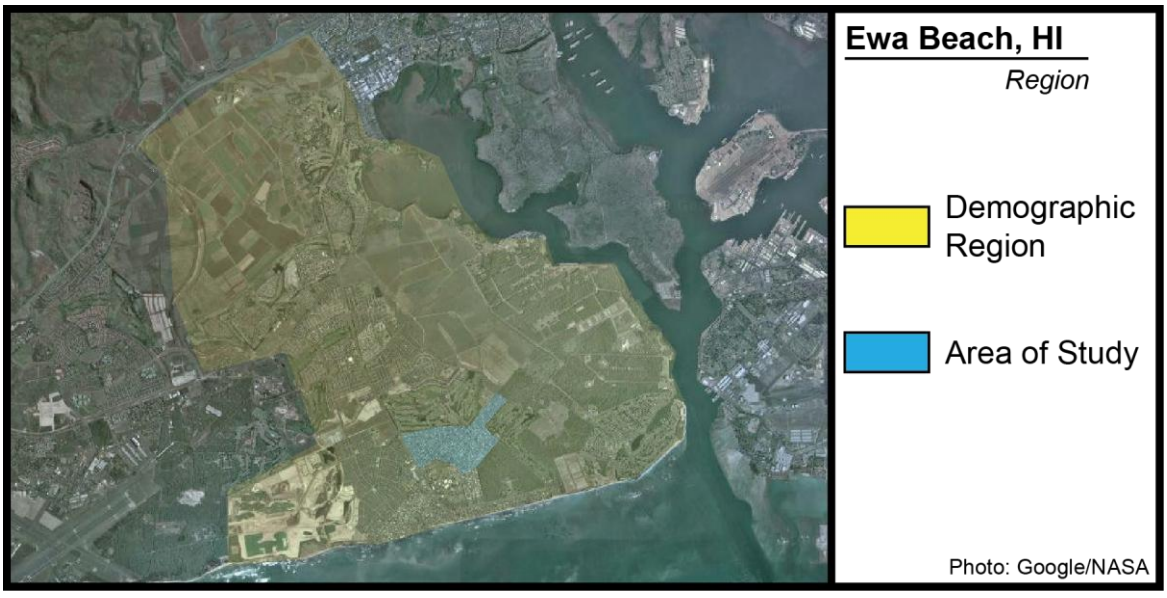
Although the Retrofit Formula can work in multiple situations, the opportunities presented within first ring suburbs provide the most ideal situation for re-development. Because of economic downturn in many of the nation's first ring suburbs, land is often available for re-development. Because of their proximity to urban cores, first ring suburbs also have the potential to tie into existing mass transit systems, which can increase accessibility and improve potential benefits such as reductions in the total amount of required parking when mass transit is present.

Site Selection Options for Testing

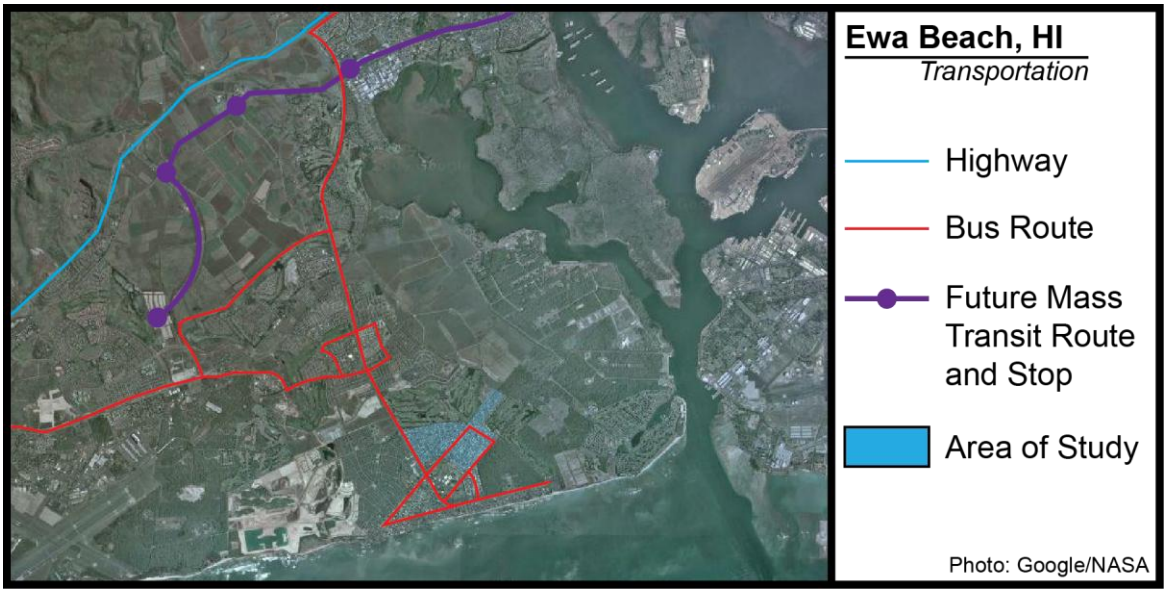
A local site will be chosen to test the adaptable retrofit technique. In order to fight suburban sprawl, growth must occur within existing neighborhoods. Oahu is in a situation where population is rising rapidly. Using this as justification, a site will be chosen to show how population and community growth can occur simultaneously in existing communities.

Site Option 1: Ewa Beach

The Ewa plain on Oahu contains the island's closest example of traditional suburban sprawl that is comparable to sprawl in mainland settings. Homes are much larger than comparably priced units in Honolulu's primary urban center and sit on larger lots. The primary form of development is single family homes and isolated commercial areas with exclusive vehicular access. Ewa Beach and Ewa Gentry have continuing greenfield developments, which rely on automobile use. From analyzing the demographics of the area, there are a plethora of reasons why Ewa Beach can benefit from re-development. There are some aspects of Ewa Beach, however, that show not all settings of suburban sprawl are appropriate for re-development.



There are many reasons Ewa Beach deserves consideration for testing a suburban retrofit. There is an area of Ewa Beach that consists of homes from the early 1960s and 70s, highlighted in blue in the previous image. Numerous homes available nearby are built after the year 2000. The homes in the area of study are also apparently declining in value. As of January 2011, nearly all homes on the market in the area are foreclosures, short sales, or real estate owned post-foreclosures[66]. The area consists solely of residential homes that are adjacent to commercial amenities but range up to a mile away from the businesses.



[66] http://www.zillow.com/homes/ewa-beach_rb/#/homes/for_sale/Ewa-Beach-HI/18029_rid/21.329735,-157.995103,21.324018,-158.007076_rect/16_zm/4_lm/1_rs/1_fr/

Commute from Hanakahi St + Kauiki St to:		Kapolei	Bishop St	Waikiki
8:00am	Car	13-15	28-33	35
	Bus + Walk	31-33	64-80	88-99
5:00pm	Car	14-16	33-35	39-41
	Bus + Walk	39	67-91	94-111

Avg. Commute
39.6

Commute Times Breakdown

> 10	*3.9%*
10 - 20	*13.0%*
20 - 30	*17.2%*
30 - 45	*23.4%*
45 - 60	*22.3%*
> 60	*20.2%*

Ewa Beach, HI
Transportation

Sources: Zillow.com, US Census Bureau, Google.com/transit

Transportation is a major factor that adds to Ewa Beach's qualifications for re-development. If local residents travel to Honolulu for work or other frequent commutes, travel options are limited. By automobile, commutes to areas of Honolulu should take less than 45 minutes, but if public transportation is used, a one way trip could take over 110 minutes. Because the area's average commute time is close to 40 minutes, higher than the estimated commute time by automobile, it is likely that most residents commute daily to Honolulu.

On the surface, it appears that Ewa Beach is an ideal location to use the Retrofit Formula. However, there is reason to believe that it is not a feasible location in which to invest re-development effort. The area is changing economically and will likely continue to develop naturally. Kapolei, which is about 4-5 miles away, is designated as Oahu's second city, after Honolulu. This means that population growth is effectively pushed to the Ewa plain, where developments will respond accordingly. In other words, the area is still growing and is likely to change in the near future in ways that may overshadow re-development efforts made at this time.

Along with the changing landscape of the built environment in the area, transportation will be receiving an upgrade in the near future. Honolulu's light rail, which is under construction as of 2011, will reach nearby Kapolei, and may

alleviate traffic and long public transit commute times between Ewa Beach and Honolulu. In addition to improved commute times to Honolulu, Oahu's plans to push growth to Kapolei means that it is likely that more job opportunities will be created there. As a result, more people may begin commuting to Kapolei instead of to Honolulu.

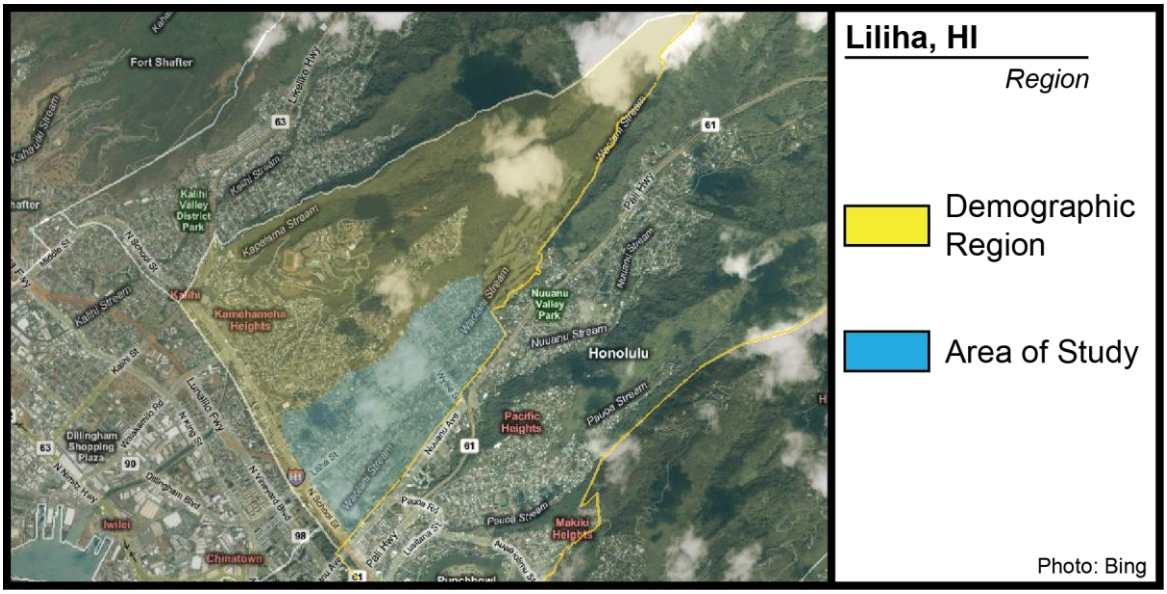
If growth were not still rapidly occurring nearby Ewa Beach, it would definitely be a primary example of an area that can benefit from suburban retrofit. Areas with similar demographics in regard to commute times, composition, and location are candidates for re-development.

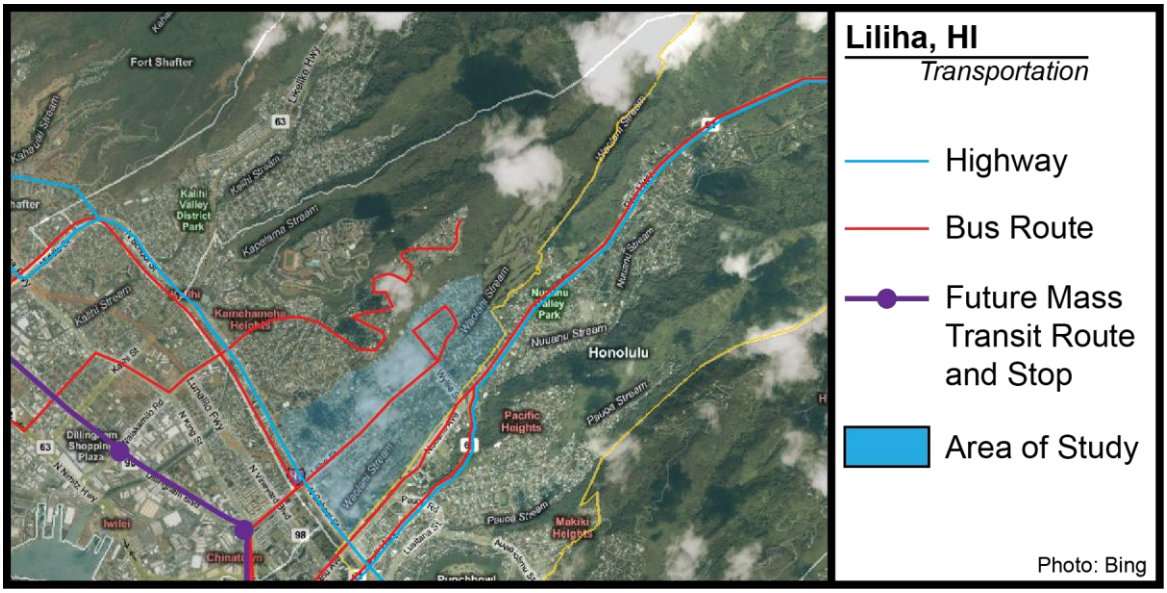
Site Option 2: Lihiha

Liliha is an area within Honolulu that is primarily residential space. Most dwellings in the area are small, single family homes with one or two bedrooms. The neighborhood is oriented as a suburban setting. Most homes in Liliha are older homes built between 1940 and 1969. The average age of residents of Liliha indicates that few younger generation professionals are investing in the community. Most residents of Liliha have lived there for 10 years or more[67].

One advantage Liliha possesses is its proximity to urban settings of Honolulu. Although it has the characteristics of a suburban setting, Liliiha is within a mile of many existing bus routes, a future mass transit line, and the central business district. It is one of the closest neighborhoods to downtown Honolulu, yet few professionals live there. The area connects to nearby points of interest on a pedestrian level, but remains relatively isolated from the nearby activities of the city.

[67] www.neighborhoodscout.com/hi/liliha





The average commute time for Liliha is 25 minutes, even though a trip to Honolulu's central business district is only 6-8 minutes by car or 15-22 minutes by bus. More than half of the people in Liliha exceed these commute times. Public transportation to other areas of employment, such as Waikiki or Ala Moana, takes significantly longer because bus routes inefficiently serve Liliha.

Commute from Liliha St + Wyllie St to:		Bishop St	Ala Moana	Waikiki
8:00am	Car	6	9-11	13-14
	Bus + Walk	15-21	28	41-42
5:00pm	Car	8	11	12-13
	Bus + Walk	19-22	32-38	38-41

Avg. Commute
25.084

Commute Times Breakdown

> 10	*7.6%*
10 - 20	*37.9%*
20 - 30	*25.4%*
30 - 45	*17.8%*
45 - 60	*6.5%*
> 60	*4.8%*

Liliha, HI
Transportation

Commute Times
(In Minutes)

Sources: Zillow.com, US Census Bureau, Google.com/transit

Liliha is a prime candidate on which to test suburban retrofit methods. Retrofit within Liliha can be used to demonstrate how preventing suburban sprawl is achieved by concentrating natural growth of an area into its existing communities. The area has the components necessary to test many architectural methods developed for successful suburban retrofit. Liliha will be used as a model to properly test and use the guidelines created for successfully re-developing residential neighborhoods for community growth.

f) Program:

For the development of Liliha, several goals were aimed to be achieved, which created sites for re-development. The objectives are as follows:

Create a Strong Main Street Presence

Establishing a strong focal destination in Liliha can be achieved through a series of interventions in a centralized location. Liliha Street can serve as a prominent main street because of its accessibility to all areas of Liliha as well as nearby areas of heavy travel. The area already has several well established

buildings on Liliha Street, such as the Hawaii Medical Center and Long's Drugs. Sites were chosen both along and connecting to Liliha Street.

Create a Walkable Environment

Sites were selected so as to create destinations within walking distance for all of Liliha. At least half of the sites selected are located within approximately 1,500 feet of any home within the defined boundaries of the community.

Capitalize on Vacant Properties

Vacant properties that tie into the fabric of the master plan are utilized to provide land for new developments. Vacant commercial structures and sites on Liliha Street between N School Street and N Kuakini Street were selected to be re-developed.

Minimize the Amount of Re-developed Residential Properties

One of the goals of the project is to show how new developments can upgrade suburban forms, not completely change it. By minimizing the amount of residential units re-developed, a greater chance of implementation exists. Blocks and sites were carefully selected to allow a high payoff to the community while sacrificing as few existing homes as possible.

Create an Emphasis on Civic Spaces

The pattern of re-development aims to incorporate and place an emphasis on public use spaces. In the center of the plan sits the Hawaii Medical Center. On the Northern end of Liliha Street proposed sites, development leads to a public park. Some public amenities are to be incorporated adjacent to the park for its users. On the Eastern end of proposed sites on Kunawai Lane sits another public park. By creating safe and prominent public corridors to walk to civic spaces such as parks, increased pedestrian activity is supported.

The desired outcome of programming is to be able to present a simplified design alternative strategy for communities that conform to the characteristics of any built environment. Re-developing the community works to achieve a higher quality of life. Through the Retrofit Formula, communities have the opportunity to evolve into healthier and more satisfactory environments. The ability to variate new community plan can appeal to current residents of a transforming community while providing developers with guidelines to help clarify and project the potential success of new establishments. With the Retrofit Formula, the value of new developments can be compared and analyzed in an area's conditions to benefit all parties involved in a community.

To measure the projected success from using the Retrofit Formula, a common unit that relates to consumers, developers, and politicians must be used. Currency is a factor that all parties can compare success to; therefore potential benefits to society are factored into dollar amounts.

Improvements of experience, marketability, energy, health benefits, home values, etc. can all be factored into dollar amounts. Using this value can allow people to understand in familiar terms how much new development can impact their community. After a total dollar amount is compared between developments and value to a community, a time-frame can be established to determine a return on investment to the community from new developments. After the Retrofit Formula is run, people will have the ability to know what kind of amenities are appropriate for the community, how much an average resident within the design area will save in dollars, and how long until the cost of new developments in the area would create a return on investment indirectly to the community and directly to the developer.

The numbers produced suggest that it is not only possible for certain businesses and public amenities to function positively within suburban settings, but that it is beneficial to the community to occur. This can help provide a defense to the "not in my backyard" mindset that many residents of a community may have. The local residents invested in a strictly residential model of living.

When developers want to change a community's model of living for personal gain, it is justifiable to believe that residents can become uncomfortable with changes that are designed to benefit developers and the community. In presenting the benefits of new developments to a community, residents may be more open to the idea that the proper developments are positive movements for the community and that supporting growth within a suburban frame can be beneficial to a number of different parties.

The various methods to improve communities can be categorized in a three part process. Part one includes information regarding site selection and planning procedures. Part two describes techniques to help promote implementation. Part three defines the architectural guidelines that should be followed in the design of suburban retrofit communities. The complete program which communities can use to help aid re-development is described below.

Part I: Define Region and Appropriate Developments

A region must be identified so that it can benefit not only the community to be re-developed, but also the metropolitan area as a whole. As described in the earlier parts of this document, there are a number of reasons that can make community re-development beneficial or even essential. All of the reasons are related in some way to a change in demographics. As the environment changes and evolves, new demographics suggest that existing communities evolve accordingly to accommodate demands from changing demographics. There are three main categories that most arguments for justification for re-development consist of.

Changes in the Economy can alter the financial landscape of areas. The change needs to be reflected through re-development. If communities do not change to reflect the economy within communities, their population might relocate to an area that is more suitable for their financial situation. Economic depressions can cause communities to plummet in value due to increasing crime

rates and vacancies. The amount of urban decay in many of the world's cities is validation that if restorative efforts are not made to help suffering communities, they can deter growth from once prominent area. In the failed communities' wake, the remains become taxpayers' burdens and growth spreads far away from the damaged communities.

The encouraging news for re-development in areas of economic downturn is that the low demand and possible government incentives can make some aspects of development easier. With lower property values and multiple vacant lots, developers can be given a large palate to work with that is more likely to be supported by a community in need than one that is functioning as advertised. Government programs can also help provide incentives for investors redeveloping certain areas. For example, Michigan's Urban Renaissance program allows residents living in approved zones of revitalization to be exempt from all state taxes to attract populations back to the area.

Under-Utilization of communities is another factor that invites redevelopment efforts. Areas may have the capacity and nearby population to support countless urban developments, but have not taken the initiative to take on the extra capacity. Growth may have occurred in surrounding areas, but residential neighborhoods often find difficulty adapting to population growth. In some areas, growth has occurred to where suburbs used to exist. The former suburbs become an urban neighborhood and do not tie into their urban neighbors because of their suburban form. When the primary urban center grows to consume former suburbs, it may be important for the areas to adapt to their role in the new urban environment.

Changes in population can also be justification for needing residential community re-development. When metropolitan areas are growing, they have two options to prepare for population growth. One way is to expand the built environment in which people live. This can mean that suburban sprawl can occur to provide homes to the new population. The other way to take on new population is to increase density in previously built areas. In areas where there may not be sufficient room to expand, such as Hawaii, or areas where urban

growth boundaries are established, such as Portland, OR, communities will have little choice but to eventually re-develop to meet increasing housing demands. If population continues to grow, there is a need to re-develop residential areas to avoid decentralization of cities.

Although concerns of population growth are high in some areas, declining populations are relevant in others. Decline in population can also suggest that communities must find ways to re-develop accordingly. Decline may lead to a decrease of urbanization or implementation of attractions to draw population from nearby areas. The same concept works in reverse. A booming economy requires inefficient communities to improve to avoid becoming obsolete over time.
New re-development scenarios to respond to changes in demographics can be generated in a 5 step process that suggests a potential retrofit idea for the region. The process tests possible developments, finds their value to the community, and offers a way to present the information to be viewed by public officials and citizens as positive upgrades to residential settings. The five step process can be used as a starting point to find appropriate developments to introduce to the area.

Step one: Site Selection

Multiple factors must be considered when determining an adequate area for re-development. Different sites will allow different design opportunities and limitations that will reflect the overall feasibility of implementing new development within a region. Factors to consider are described within the research document.

Proximity to nearby cities needs to be considered to determine the extent that transit options are affecting a given region and what transportation alternatives are available given the nature of adjacent regions or cities. In first ring suburbs, it is possible that mass transit can adjoin to a retrofitted suburban area to provide different transportation alternatives and allow parking for the

footprint of new developments to be downsized. In a site miles from a primary urban center, transportation methods can be limited, thus limiting the amount of ways commuters can travel to a new public space.

Individual communities must also be considered. In certain situations, suburban communities may be content with their way of life and opt to not welcome new plans to re-develop land within their communities. There are opportunities, especially in first ring suburbs, where change is needed to revitalize decaying suburbs. Vacant homes decrease property values within communities, increase crime rates and become a public burden. During economic downturn, value of homes decrease to the point that the expense of new development is cheaper and the need for revitalization in the existing community can be encouraged.

Step two: Determine Development

The type of desired development needs to be determined in order to infer the parameters that a certain building type demands to be profitable and remain operational. After obtaining an average sales report of a type of business, the number can be correlated to the number of people required to support the development by dividing the total sales by the number of clients. Since the number of consumers fluctuates and is difficult to obtain in retail settings, the total number of people required to maintain a business can be found by dividing annual sales by the average annual trips a person makes to such a business. The result is then multiplied by the frequency of shopping at a similar establishment and also by the average amount spent per trip. The result reveals the amount of people that are needed to support the establishment.

The variable in the equation, the frequency of the average shopper, can be obtained in a number of ways. Marketing data is available to determine how often consumers shop at similar stores. The strongest source of market data may be from large chain stores that have established frequent shopper programs to

determine how often the average shopper shops at their stores. After finding out how often shoppers visit a store, the total number of people required to operate the establishment while maintaining average profits is found.

A general guide that can help create ideas for re-development can be found from successful case studies. Communities must be based on information that leads to the most successful possible outcome. The Retrofit Formula can test the viability of particular developments for an area, but to determine which developments to suggest, successful projects must be referenced. To help a region depart from the suburban theme of low density housing units, existing traditional neighborhood developments (TND) can be referenced. Below, a chart shows some of the characteristics of some development projects. The chart is derived from community information indexed in Appendix B.

Location / Development	Total Area (Square Ft.)	Population per Acre	Housing units per acre	% of total area retail	% of total area office	% of total area parks and civic
Lakewood, CO (Belmar)	5,227,200	28.0	10.8		4.26	
Stapleton, CO	209,088,000	6.4	2.6	0.72	4.78	23.04
Seaside, FL	3,484,800	seasonal	6.1	1.99	0.75	
Birkdale, NC	2,265,120	16.1	6.2	13.24	8.83	minimal
Celebration, FL	213,444,000	2.42	0.8	4.40	4.40	95.5 (adj.)
Fall Creek Place, IN	6,969,600					
Southern Village, NC	10,018,800	13.0	5.0	1.26 (est.)	1.26 (est.)	40.00
Crawford Square, PA	696,960	45.4	16.2	0	0	59.42
Fruitvale Village, CA	257,000	20.7	7.9	15.56	44.50	44.36
Hercules Waterfront District, CA (In Progress)	4,094,640	24.5 (estimate)	10.6	2.44	n/a	1.47
Average	45,554,612	19.56	7.36	4.95	8.59	37.68

Table 1 – Successful Mixed Use Communities

By referencing the amount of particular developments within successful and desired urban forms, suggestions for developments to test with the Retrofit Formula can be proposed. In the developments examined above, similar ratios of building types to area and density can be found. According to the numbers above, it is a sensible proposal to introduce similar amounts of the same development types in relation to the size of the selected site to be retrofitted.

Step Three: Determine Population within Desired Transit Option Use

Mobility relates to the proper scaling of a development. A proposed development requires a certain amount of users to be profitable and create a return on an investment. The role of transportation is amplified in sprawling suburban settings because only a few transportation choices exist. The usage of different transportation methods that are viable for communities are required to determine the amount of use an amenity can attract within a certain range. In suburban settings, the primary mode of transportation is personal automobiles. Automobiles are used for 89% of all commutes in the United States[68]. Transportation methods are to be considered for section C of the Retrofit Formula.

For pedestrians, maximum walking distance needs to be considered to determine the number of pedestrian commuters needed to support new developments. Smart Growth has defined this distance as 1,500 feet in a single direction[69]. Automobile commutes can be factored by using by the average commute distance by vehicle to an amenity similar to what is proposed. Knowing the maximum distance people are willing to commute to visit certain amenities can help identify a percentage of the nearby population that is willing to travel to the new development either by preference or proximity.

Even though the two main modes of transportation in the United States are walking and driving automobiles, in a suburban re-development, the landscape is in such a size that walking is not always feasible. Relying on automobiles contributes to the need for additional resources dedicated specifically to travel by automobile, such as large parking lots and street oriented buildings. Different transportation methods can be proposed to net different maximum consumer travel distances to determine the body of consumers who will realistically support the amenity.

[68] United States Census Bureau, American Community Survey, 2008
[69] Smart Growth Online. “Principles of Smart Growth” The Smart Growth Network. www.smartgrowth.org/about/principles/default.asp

Cycling is a common mode of transportation where the average distance one is willing to travel via bicycle is greater than on foot. Although cycling commuters are willing to travel an average of 7.3 miles to work daily, they account for less than 1% of the daily bicycle trips in the United States[70]. It is important to encourage modes of transportation such as cycling because they may allow communities to remain at less dense while also reaping benefits of more densely populated areas, which helps reduce the amount of changes required to existing residential spaces. The 7.3 mile commuting distance can be used for less than one percent of part C of the Retrofit Formula unless a program is developed within the region to promote usage of bicycles.

With the idea that an average desired commute time is between 10 and 15 minutes[71], a number of other transportation alternatives can be presented. However, because transportation methods that do not include bicycles, automobiles, and walking are utilized by few households, it is not feasible to rely on the use of different transportation methods to support a new development. What additional transportation options can offer, however, is a defined distance from a new development that residential areas can be to allow them to operate profitably.

The Segway, for instance, is a relatively new type of transportation that is comparable to, but quicker than, walking. The average speed of the Segway within a sidewalk setting is 8mph[72]. To achieve a 15 minute commute time from a given point, residents would ideally be located within 2 miles from a development to be considered within commuting range. Comparing the possibilities of an exclusive Segway community compared to a totally walkable one, the Segway community has the potential to be spread over an area 12 times larger. The Segway community would still support the same developments in a walk- only

[70] Steven G. Goodridge. "The Segway Is a Vehicle: Implications for Operation and Regulation of the EPAMD in Traffic" North Carolina Coalition for Bicycle Driving 2003

[71] Lothlorien S. Redmond & Patricia L. Mokhtarian. " The positive utility of the commute: modeling ideal commute time and relative desired commute amount" Transportation 28: 179–205, 2001

72 Steven G. Goodridge. "The Segway Is a Vehicle: Implications for Operation and Regulation of the EPAMD in Traffic" North Carolina Coalition for Bicycle Driving 2003

community while maintaining a pedestrian scale. If there is a way to provide or require community members to use Segways, the area of communities could increase without automobile use. Estimating maximum commute ranges and their effects can also be considered for numerous other applications such as golf carts, trolleys, busses, etc.

Step Four: Run the Retrofit Formula

A) For total population required to support

$$\frac{\textit{Annual Sales}}{\textit{(Trips per Shopper per year * x) (\$ per trip Spent)}}$$

x = percentage of trips per year spent at establishment

B) For total household units needed:

Result A/ Average Household size

C) To determine density to support average type of establishment:

C1) Sufficient with local density within walking Distance

*(Л *Maximum walking distance² - Building footprint) / A [or B for household]*

C2) Sufficient with local density following average commute distance

*(Л *average commute distance² - Building footprint) / A [or B for household]*

C3) Sufficient with maximum commute for region

*(Л *Maximum commute distance² - Building footprint) / A [or B for household]*

C4) Sufficient with other methods of transit

*(Л *average/desired commute distance² - Building footprint) / A [or B for household]*

D) Determine return of investment to developer and existing community

I.) Total dollars saved to average consumer from new amenity

(*Average trips to similar * x* Average trip time (hours) * Average hourly wage)*2*

+

*((Average trips to similar * Average trip distance (miles) / average miles per gallon) * Average gas price)* x*2*

= Total amount of dollars saved by community member

(Excluding traffic and stress factors)

II.) Total distance less traveled

*Average Household size * Total number households defined in region B * average trips to similar * average distance to similar * x*2*

= total distance less traveled by community

III.) Estimated contribution to community annually in dollars

*Average household size * number of households in defined region B * I.*

= Total amount of dollars contributed to community

(Excluding property values)

Step Five: Present Data to Public Using Dollar Figures

Presenting potential positive community impact in a dollar amount allows consumers to identify and relate to the importance of re-development and how it can affect them. Providing access to the five step design criteria to the public is necessary. With access to the five step process for re-development, members of communities as well as developers have a tool to guide them to create their own successful retrofits in suburbia with personalized design criteria. With figures of the potential benefit available to a community, re-developing sprawling suburbs for community growth can prove to be a worthwhile effort.

Part II: Implementation

Implementation of re-development plans can be excessively complicated in suburban settings. It is important that the benefits of re-development can improve communities for the better. The majority of people do not unconditionally oppose growth in their community, but roughly 50% of 1000 polled adults say that increased residential and commercial growth and real estate development depends on the situation and the circumstances[73]. The plan for retrofit is designed to show local populations which circumstances are right for their community's unique situation.

A) Actions to Take with Governing Bodies

Aquire proper zoning, jurisdiction of proposed community, etc.

B) Funding

In order to make re-development a reality, funding must be available. Numerous government, non-profit, and for-profit organizations run programs that provide communities the necessary resources to improve and grow. A list of

[73] Belden Russonello & Stewart, "2007 Growth and Transportation Survey" (survey conducted for Smart Growth America and National Association of Realtors 2007) http://www.smartgrowthamerica.org/narsgareport2007/narsga2007fullpoll.pdf pg4

organizations or programs that can provide funding is indexed in Appendix B. It is important to consider funding for re-development because the difficulties of dealing with a previously developed site can outweigh the benefits in the eyes of potential investors. Designing communities within the guidelines that make them eligible for funding helps the odds that implementation can be achieved.

C) Acquiring Land

Acquiring land can potentially be the highest priced obstacle in re-development situations. In many cases, buildings exist on sites that are needed for re-development. Where occupied homes exist, purchasing blocks of property can be extremely difficult. Not only do residents often choose to not sell their properties, but they can actively boycott development plans since they might feel that they are being pushed away from their homes.

The following is a list of methods to acquire land for re-development. These methods offer ideas about how land can be acquired while leaving members of existing communities as undisturbed as possible.

1) Vacant Properties

Vacant properties are ideal for suburban re-development. Vacant properties often have motivated sellers and can be purchased for much lower than the market value of occupied units. Homes in foreclosure or Real estate owned post-foreclosures in possession by lenders are in need of sale. By acquiring vacant properties, land is easily attainable and can help owners in desperate need of selling a property.

In addition to the convenience of acquiring vacant properties for re-development, the local market will directly benefit. Crime associated with vacant units will be reduced and the value of adjacent properties will likely increase with proper restoration efforts.

2) Open Spaces and Government Owned Land

Open spaces such as parks, gardens may be obtained with local and/or state governmental assistance.

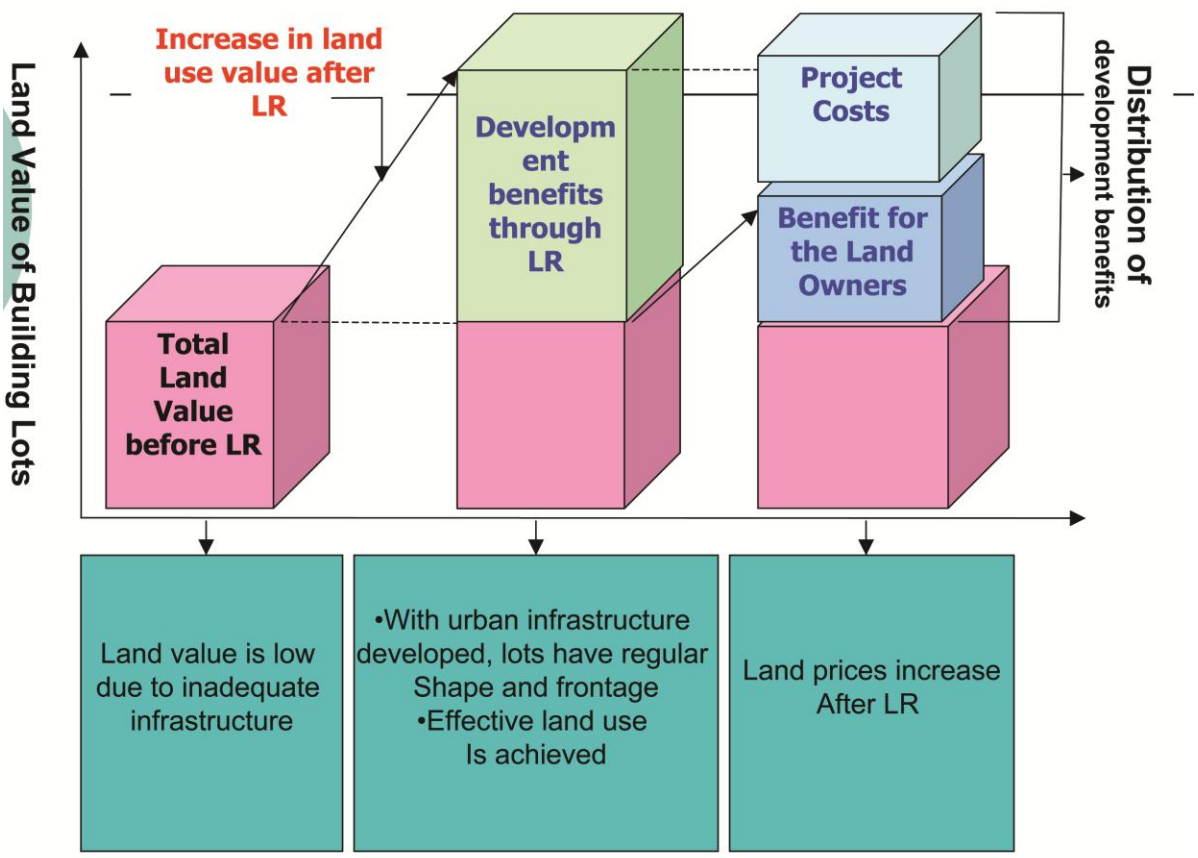
3) *Private Property*

Residential and commercial properties under private ownership.

Land Readjustment

There is a system that can help to implement re-development in established areas. Land readjustment is a system invented where land is not readily available to develop. One of the main goals of the system is to "guarantee the equitable sharing of costs and profits among landowners affected by re-development."[74] This means that much of the profit that is achieved in re-development in distributed to those who had to give their land to new developments. This can serve as a powerful incentive to homeowners to support re-development while avoiding condemnation.

[74] Luciano Minerbi, Peter Nakamura, Kiyoko Nitz, and Jane Yanai." Land readjustment: the Japanese system" Boston, MA, Oelgeschlager, Gunn & Hain, in association with the Lincoln Institute of Land Policy, 1986



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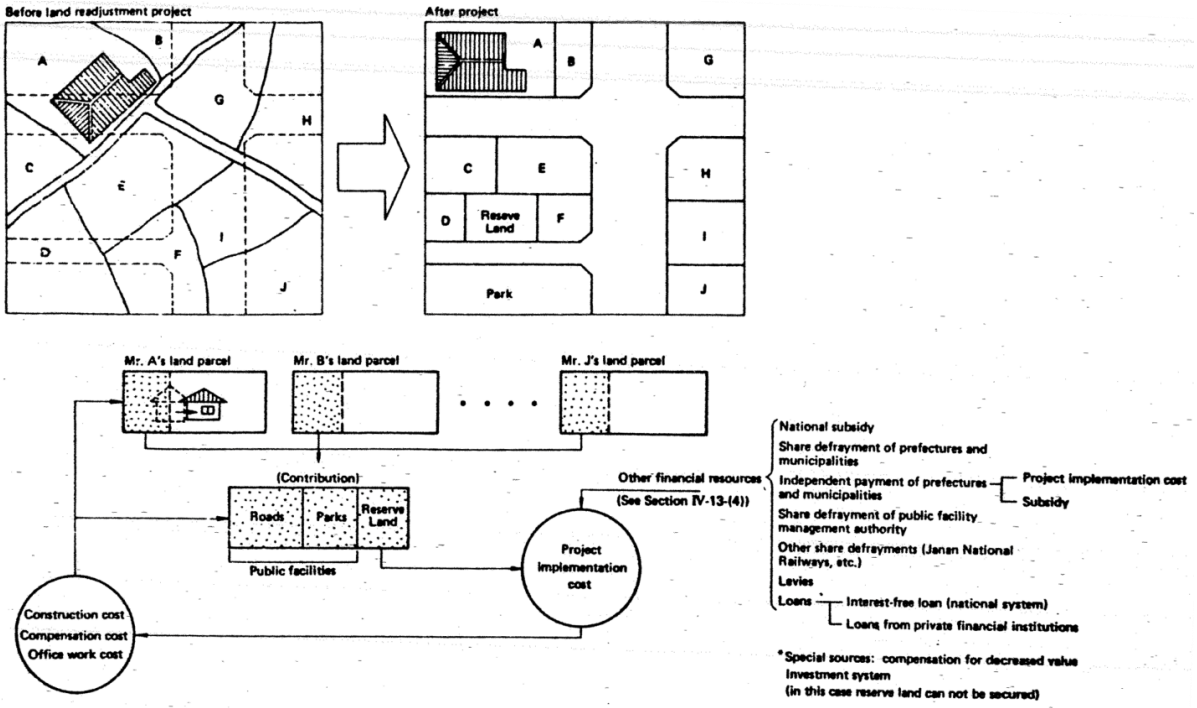
The figure above shows how land readjustment is a self-sustaining system. Through increasing land values, there are more benefits to be distributed between land owners and developers. The diagram below demonstrates the same theory with the inclusion of how it affects land in the process.

[75] Luciano Minerbi and Keshav Bidari." Land Readjustment for Urban Development" Honolulu, HI, University of Hawaii Department of Urban and Regional Planning, 2009



Source: Nagoya City Planning Bureau (1982) p. 2

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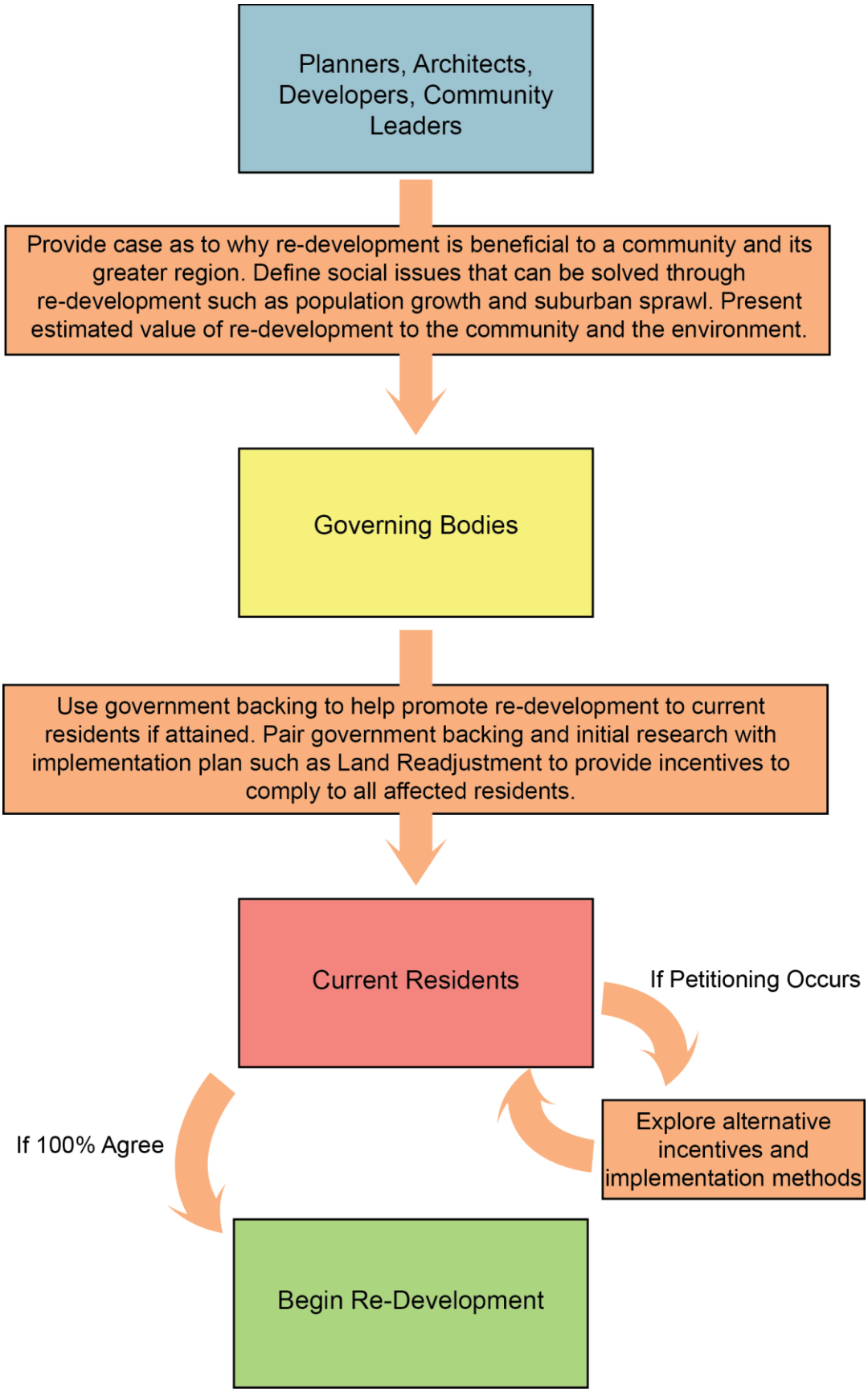
When architects, planners, developers, or community leaders can prove that there is a solution to improve an existing community, the proposal can strengthen its chances for implementation. By employing techniques that appease policy makers, developers, and consumers, all major parties of community planning can be accounted for. Using tools such as community facilities districts and land re-adjustment can help to land owners and residents accept re-development efforts. The general process to follow to apply re-development strategies can be followed in the flow chart on the next page.

The chart can help provide advocates of community re-development in their process of determining which steps to take to achieve implementation. The bulk of the planning and design efforts outlined in this document can serve as a starting point to follow the path to application.

[76] Luciano Minerbi."Land Readjustment Concepts and Applications (a set of maps)" Honolulu, HI, University of Hawaii Department of Urban and Regional Planning, 1986


Planners, Architects, Developers, Community Leaders
Provide case as to why re-development is beneficial to a community and its greater region. Define social issues that can be solved through re-development such as population growth and suburban sprawl. Present estimated value of re-development to the community and the environment.
Governing Bodies
Use government backing to help promote re-development to current residents if attained. Pair government backing and initial research with implementation plan such as Land Readjustment to provide incentives to comply to all affected residents.
Current Residents
If Petitioning Occurs
Explore alternative incentives and implementation methods
If 100% Agree
Begin Re-Development

Part III: Architectural Guidelines

After necessary planning and implementation procedures are completed, the architecture of a development must be designed. In many cases, architectural projects are pre-determined and be generally uninfluenced by the characteristics of a site. Homes of sprawl are designed this way because few homes are planned and designed according to any community design standard. Using the three part retrofit process, new developments will follow a pre-determined set of guidelines to influence architectural forms. Each building that is developed or re-developed will follow a set of architectural guidelines.

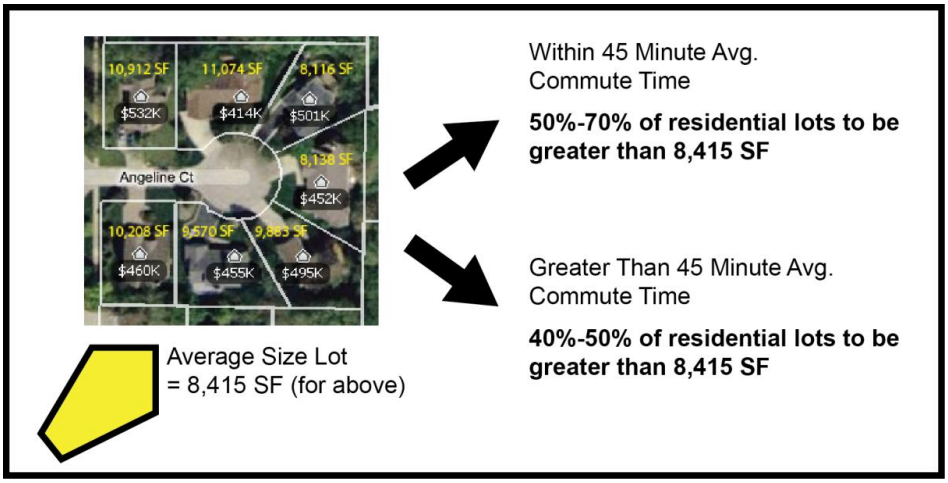
Using the guidelines and criteria set by the various groups of mixed-use development advocates provides a set of standards to achieve in the re-development. Using the principles from Smart Growth or New Urbanism allows the re-development to follow a proven set of standards to follow. As described earlier in the research document, there is also a large body of form-based codes available for communities to adopt. Architectural guidelines derived from form-based codes, such as Smart Code, can provide technical architectural suggestions appropriate for different design scenarios. They can provide reasoning to support arguments about building placement, sizing, orientation, etc.

Existing architectural codes do not have all the answers required to re-develop communities though. Communities also need help defining appropriately-sized developments for their specific case. Like the form-based codes that have been developed for architecture, planning strategies need form-based codes to follow as well. Including planning in the form-based coding conversation can help non-professionals determine how to pursue re-development. Planning also serves as a guide to help professionals propose appropriately sized developments.

The other need that is not filled with current architectural guidelines is how to develop according to demand. Suburban sprawl continues to grow because there is a demand for the types of homes it creates. If the preferences of consumers are not considered in re-development, there is a possibility that re-development will be unsuccessful. Also, to discourage suburban sprawl, techniques need to be provided to show that popular attributes sprawl can be accommodated in the re-development process.

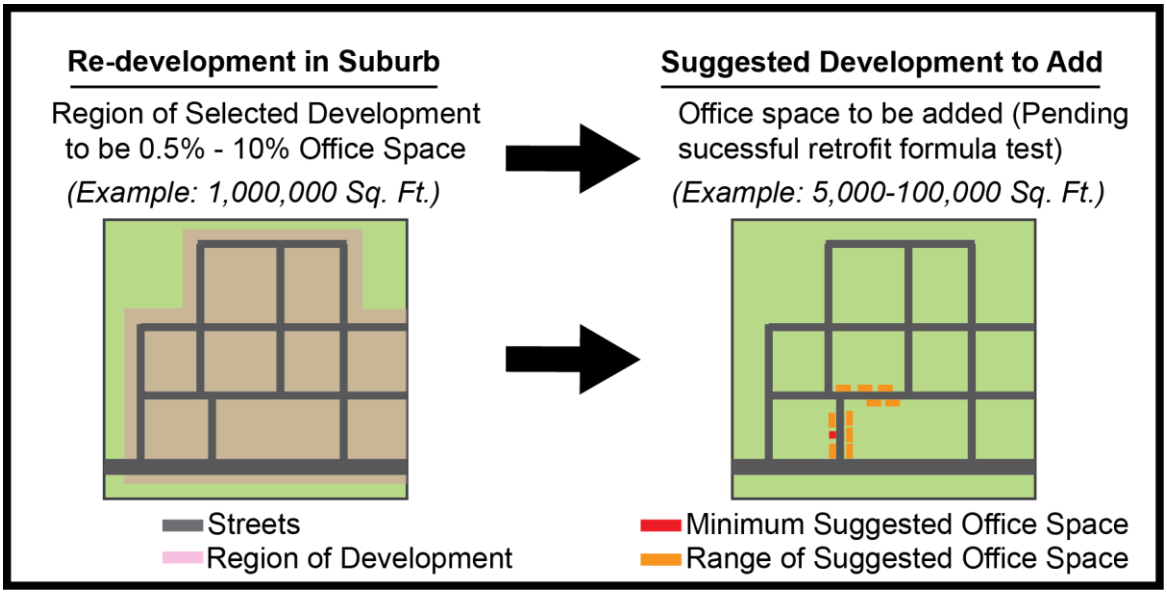
Architectural guidelines must be determined in a fashion that displays neutrality between homeowners and developers. To ensure that architectural guidelines are as fair to both developers and homeowners as possible, they must be created with as little subjectivity as possible. Developing codes to compliment the body of guidelines available can be achieved by basing architectural guidelines on statistical research. By using varied forms of research, results can be quantified into how they should be reflected in suburban re-development. The following codes are designed to complement codes of mixed use.

R1) Large Lot Homes - The total footprint of the area of residential development shall be 40%-70% dedicated to single family homes on large lots. “Large lot” homes refer to surpassing average lot sizes within a proposed development area. Areas of development with an existing average commute time to work of 45 minutes or more must be between 40%-50% for large lot homes. Between 50%-70% of commute times must be lower than 45 minutes.



According to consumer preference surveys, one of the most valued assets of suburbia is its ability to offer large plots of land to homebuyers. In most cases, cities cannot offer highly desirable plots of land while suburbia can. Due to existing demand, large lot homes must play an integral part in re-development. Because up to 70% of the general population would prefer to live in large lot homes and rely on automobiles rather than in a community consisting of small lot homes that is walkable[77], the ratio must be reflected in suburban communities. However, when commute times reach 45 minutes, the preference of the population is split between large lot communities and communities with shorter commute times[78]. As commute times grow, the trend of support for large lot communities falls. The percentage amount of large lot homes suggested in a development region correlate to average commute times to work.

C1) Office Space Requirements

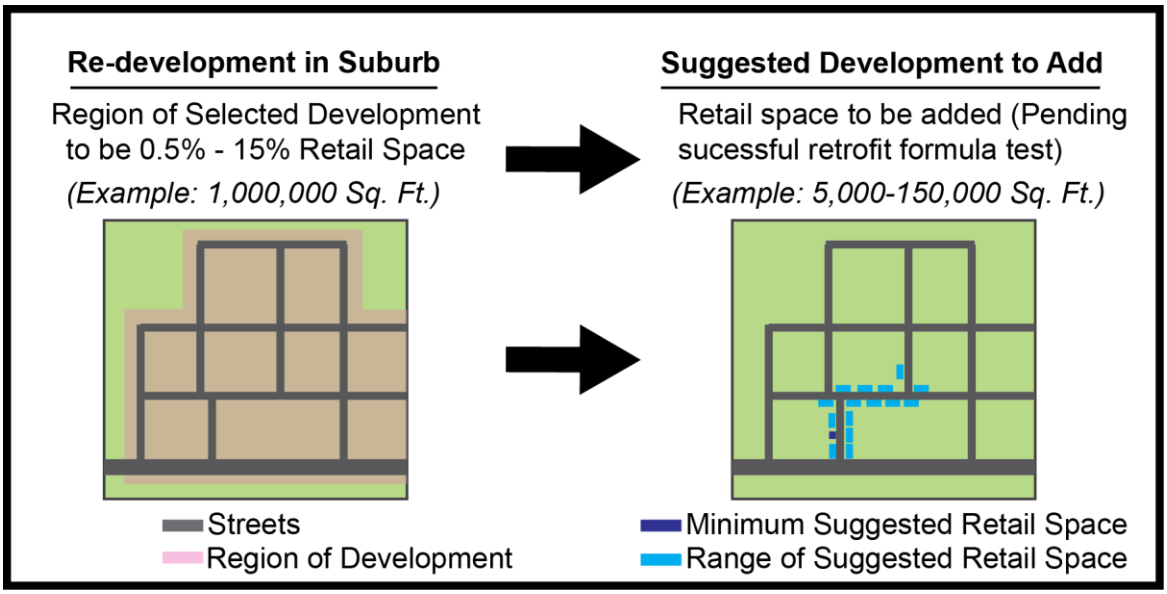


Several existing mixed use developments were considered when developing office space standards. Mixed use developments held in high regard

[77] Belden Russonello & Stewart, "2004 National Community Preference Survey" (survey conducted for Smart Growth America and National Association of Realtors August 26, 2004 - September 6, 2004) www.smartgrowthamerica.org/documents/NAR-SGASurvey.pdf pg2
[78] Belden Russonello & Stewart, "2004 National Community Preference Survey" (survey conducted for Smart Growth America and National Association of Realtors August 26, 2004 - September 6, 2004) www.smartgrowthamerica.org/documents/NAR-SGASurvey.pdf pg3

were collected and placed in Appendix B. The information regarding size and composition of each development were compared and averaged in Table 1 to suggest similarly sized developments to a project. Generally, the range of office space in comparison to total land area was between 0.75% and 44% with some have no office space. The 44% scenario was inconsistent with the rest of the developments and was factored out. According to the precedent studies, anywhere from 0.5% and 10% of total office space in a development can be acceptable.

C2) Retail Space Requirements



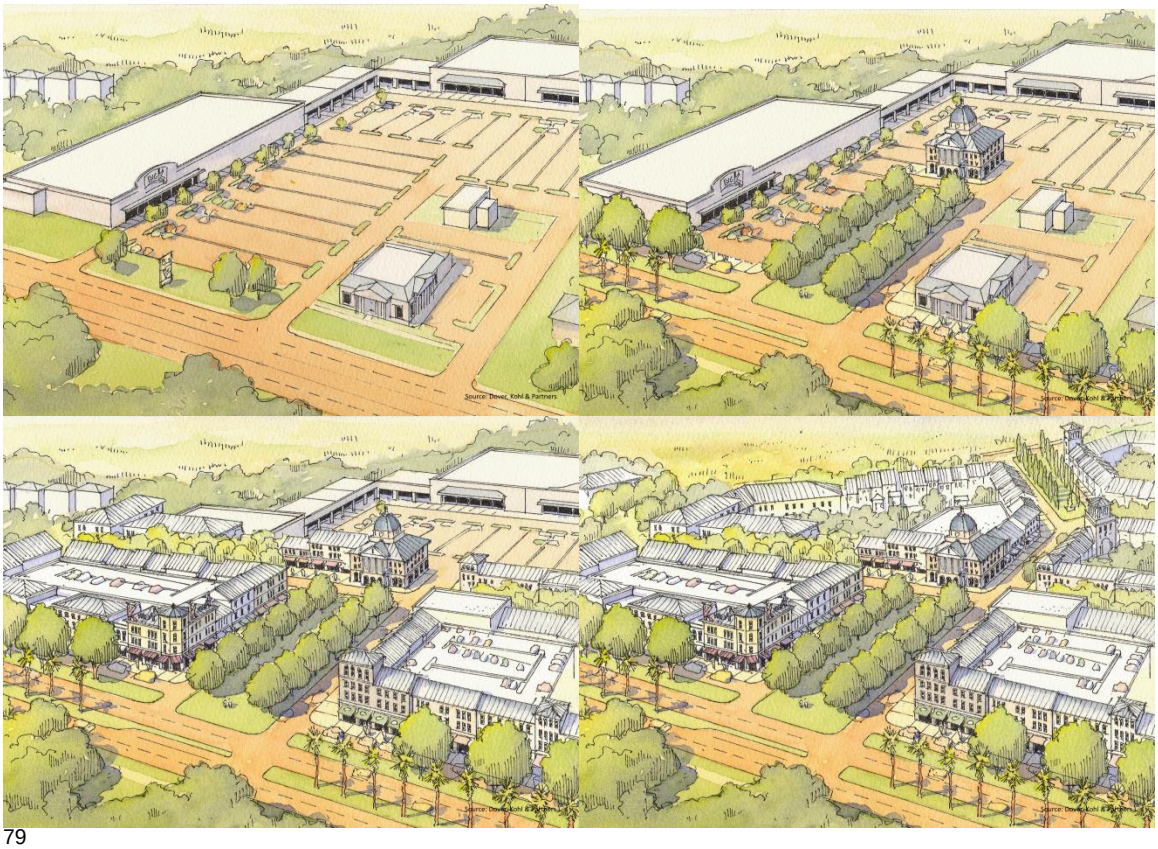
Developing standards for appropriate sizing of retail space was derived in the same fashion as office space. The same developments from Appendix B were considered. The information regarding size and composition of each development were compared and averaged in Table 1 to suggest similarly sized developments to a project. Generally, the range of office space in comparison to total land area was between 0.72% and 15.56% with some having no retail space. According to the precedent studies, anywhere from 0.5% and 15% of total retail space in a development can be acceptable.

X1) Re-development Capacity

Determining the capacity of re-development can help prevent over-developing or under-developing. This research has established the Retrofit Formula as the guide to determine if there is sufficient regional population to support proposed developments. If there is not, the formula suggests scaling the proposal or introducing greater population to the area. If a system is not used to estimate if a development has the local support for success, then it runs the risk of failing. Systems should calculate if the local economy can support re-development efforts. While determining profitability is essential for developers, architects and planners should have a way to estimate properly sized buildings into re-development plans.

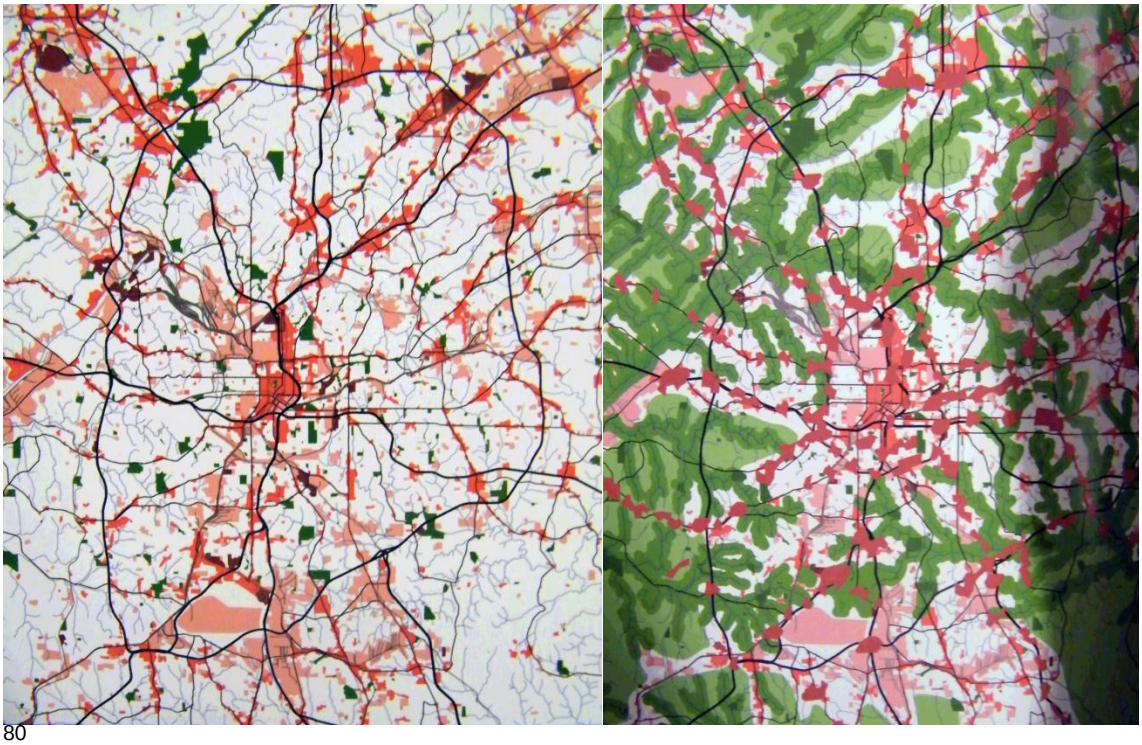
g) Design Models:

Although many attempts and successful developments have targeted improving suburban communities, the design models are not always easily adaptable to be used in additional re-development projects. Many re-developments have a site specific design criteria that is determined and non-transferable to different situations. Essentially, most community retrofits benefit by having more public amenities closer to home.


79

The suburban re-development above is an example of a site specific re-development. In this scenario, a strip mall is retrofitted in stages to turn into a town center. The desired process of a residential neighborhood development using the Retrofit Formula would follow a similar process where amenities could be added slowly as they are needed and can grow naturally with population growth patterns.

[79] The Congress for New Urbanism, “Sprawl Retrofit Initiative” 2008. Pg.6-9



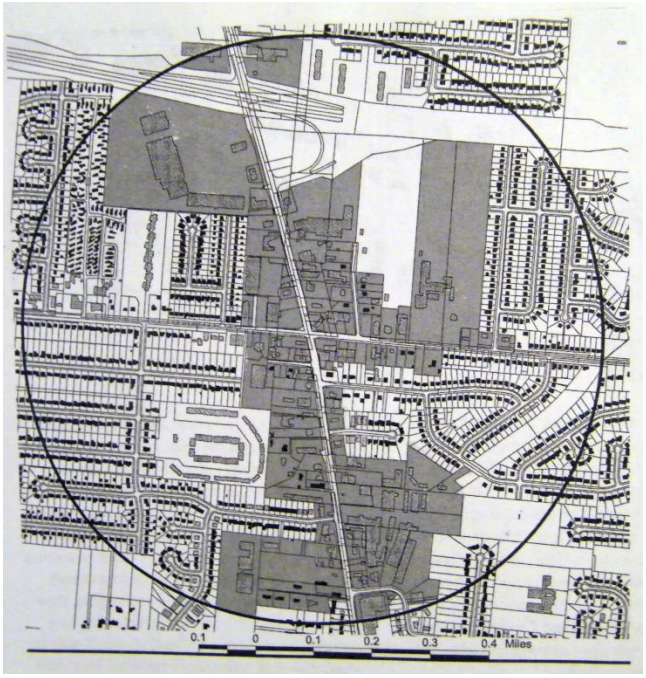
80

In the above diagrams, an urban design theory was employed in Atlanta that offers a solution to the existing sprawl. The driving the concept is that areas that have sprawled away from downtown Atlanta can become smaller city centers. Keeping growth within the existing infrastructure can allow green spaces to develop stronger around the city. The development is based on existing infrastructure, similar to the technique to be used in the in the proposed suburban retrofit using the Retrofit Formula. In both re-development strategies, growth is limited to communities that are already established.

80 Ellen Dunham-Jones and June Williamson, Retrofitting Suburbia: Urban Design solutions for redesigning suburbs. Hoboken, NJ: John Wiley and Sons 2009. 80

DPZ & Co

The above suburban re-development, done by some of the leaders of the New Urbanism movement, shows a way to introduce new circulation in suburban roads that support different routes of travel. It also shows that increasing density via a main street consisting of different types of housing and public spaces can create a strong center for the development that was previously not present. The idea to improve circulation within existing suburbs is imperative when attempting to promote better connectivity and focal points of a community.



Design by Brenda Case Scheer

The previous plan shows a type of mixed use that is typically unseen together, a large mall and residential plots. The ability to try new ideas and succeed will be greatly increased by being able to test potential benefits of the project before actually carrying through a design. The Retrofit Formula can provide an estimate of those potential benefits.

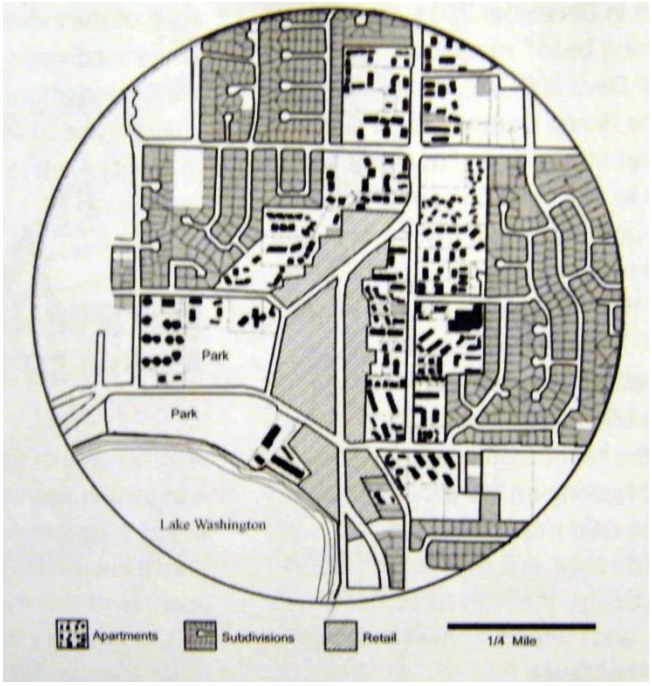


Image by Paul Hess

The above design solution in a portion of Seattle presents an idea that mixed use developments can function well even when building types are separated. Large apartments are shown to serve as a buffer between residential and commercial spaces. The arrangement can allow intimate and social living spaces within the same development. The model can offer a precedent of successful orientation when introducing similar development in a residential setting.

h) Initial Formal Concepts

Testing Design Criteria for Re-development: Liliha, HI

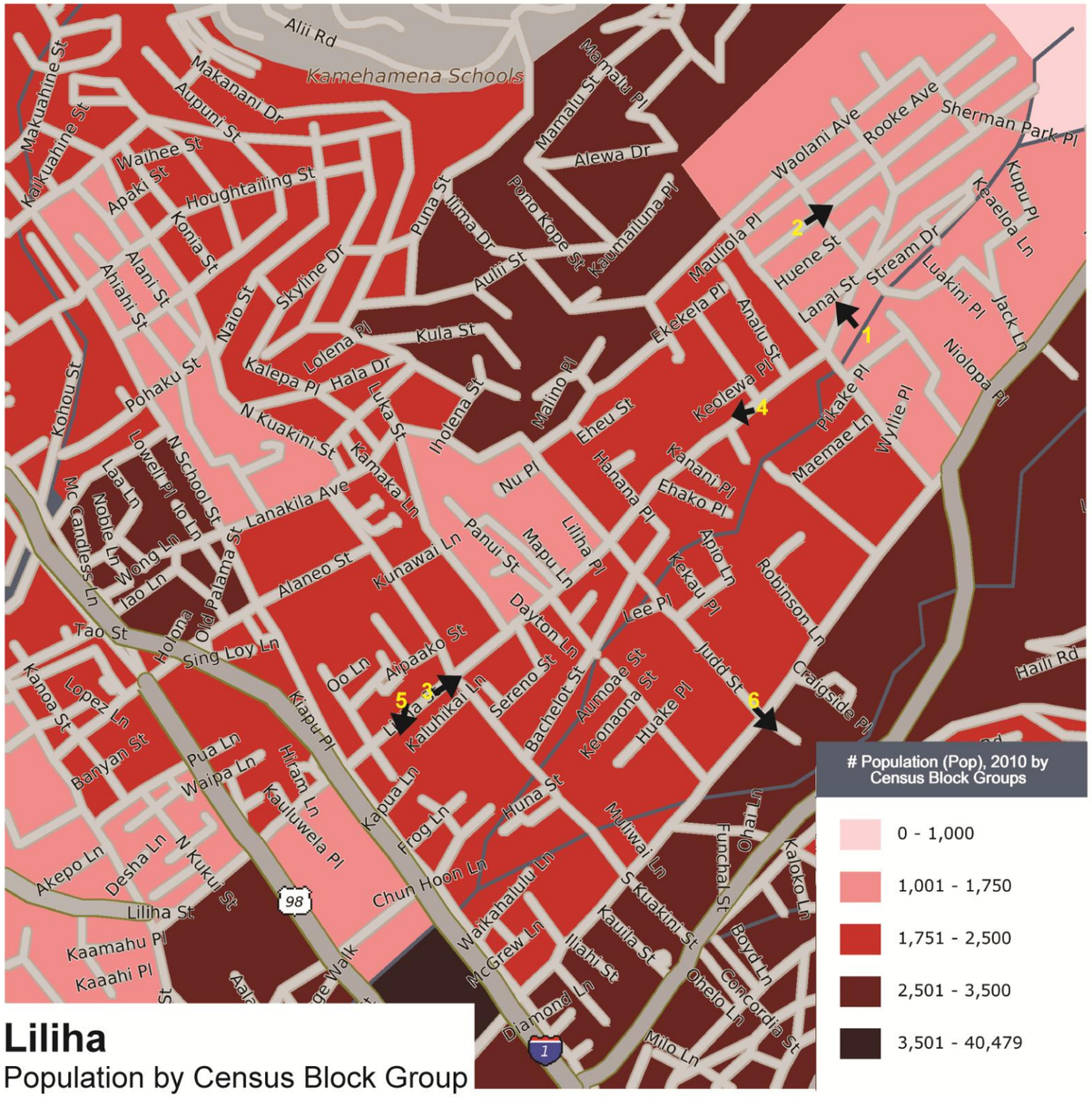
Part I: Define Region and Appropriate Developments

The boundaries of Liliha are defined by geographic constraints. The area lies in a valley near the edge of Honolulu's primary financial district. The area is broken into several census block groups (in which all demographics are taken from). The map and photos on the following pages show the existing area.

Liliha is adequate for re-development for two major reasons. First is that land is scarce on Oahu. Although Honolulu's plan for population growth is to direct growth toward Kapolei and the Ewa plain, measures can be taken to also prepare for growth within the city. It is possible that land outside the city available to develop will be depleted in the near future. When only developed land exists, it will be necessary to re-develop existing areas of low density. Re-developing now can help prolong the life of greenfield sites and prevent suburban sprawl.

Another reason Liliha is adequate to test re-development strategies is because of its under-utilization. The area is roughly one mile from the heart of Honolulu's downtown. Being so close, the area could serve as a primary area for housing the thousands of workers who commute to downtown Honolulu daily. Liliha, though, is an aging community where most homes were built between 1940 and 1969 and most of the population reflects the same age. The area is close to highways, bus lines, and a proposed mass transit rail stop. However, the aging community is failing to attract new growth and developments; 33.51% of the population is aged 65 years or more as of 2010. This is roughly three times the national average and over twice the average for Honolulu[81]**.** By re-developing Liliha, greater utilization of the area can be established.

[81] **SimplyMap** [New York, NY : Geographic Research, Inc.] *Census 2010 Projections*, Retrieved FEB 2011 from SimplyMap database. www.simplymap.com



Liliha
Population by Census Block Group

1

2

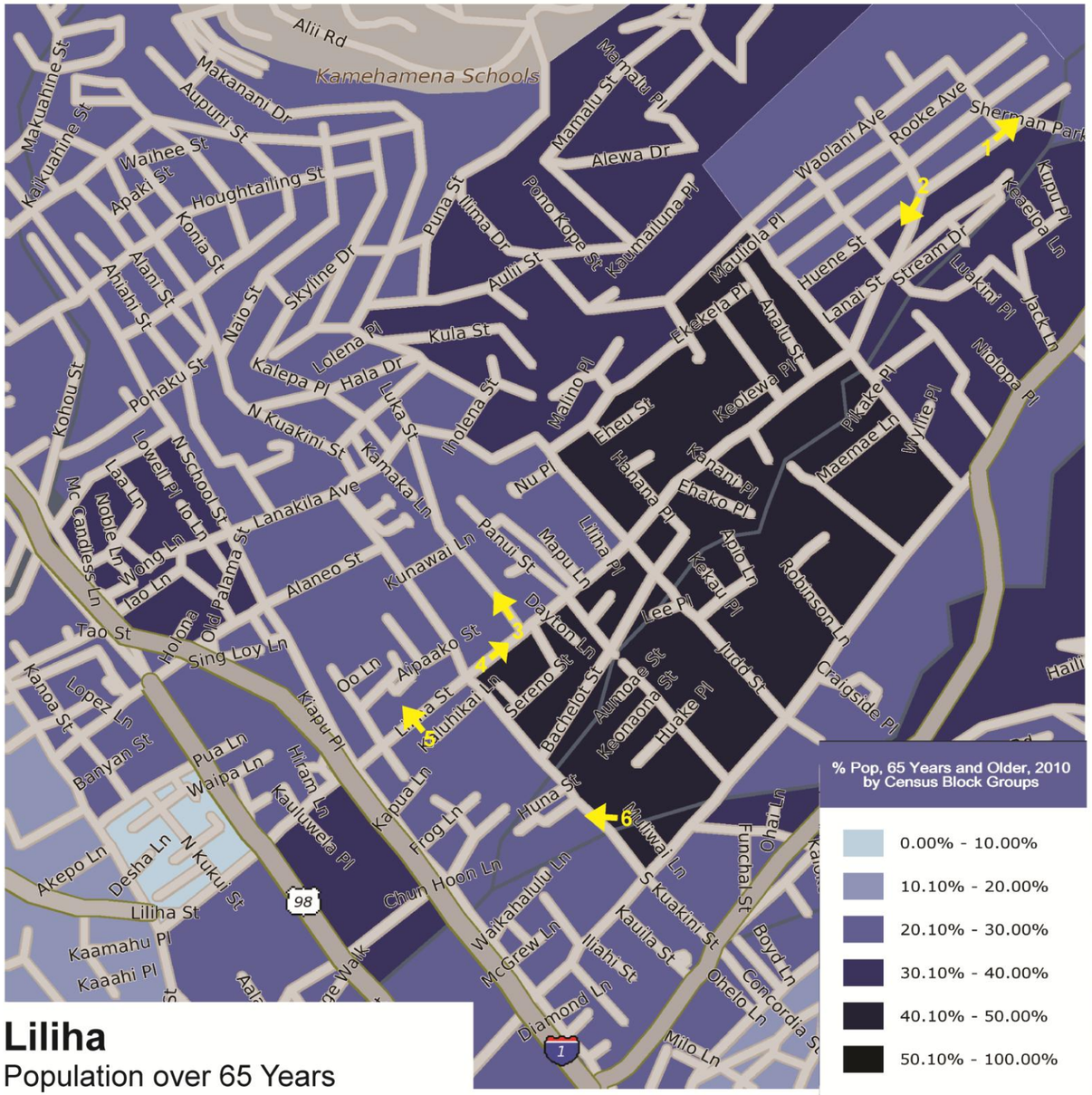
3

4

5

6

[82] SimplyMap [New York, NY : Geographic Research, Inc.] Retrieved FEB 2011 from SimplyMap database. www.simplymap.com



Liliha
Population over 65 Years


1


2


3


4


5


6

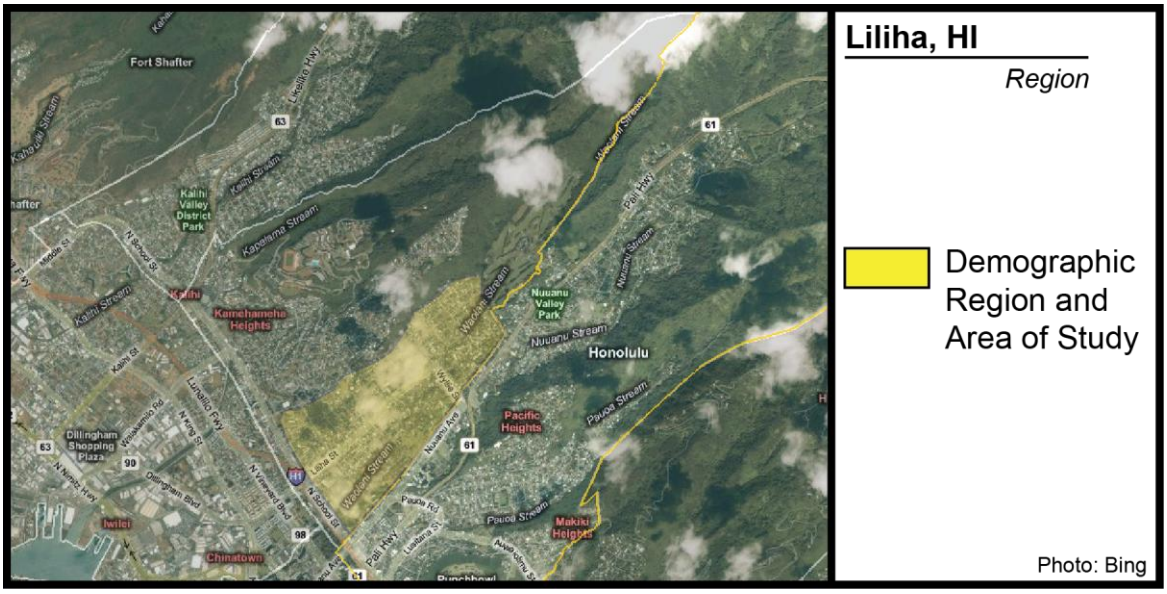
83

[83] SimplyMap [New York, NY : Geographic Research, Inc.] Retrieved FEB 2011 from SimplyMap database. www.simplymap.com

Retrofitting Liliha Using a 5 Step Process

Step One: Site Selection

Below is the area of Liliha which will be studied and tested for appropriate re-developments to implement community growth. The area selected to test retrofit solutions is located in Liliha between Nuuanu Ave, Alewa Heights, School St, and Oahu Country Club.



This former suburb of Honolulu features adjacency to a relatively large regional population. It is possible that with proper design, the nearby population would help support new businesses opening in the area. Because of the possibility of attracting a greater regional population to use new developments within Liliha, larger developments than in isolated suburban situations could be introduced. Re-development in the area could create a destination for nearby regions, which must be considered when sizing developments.

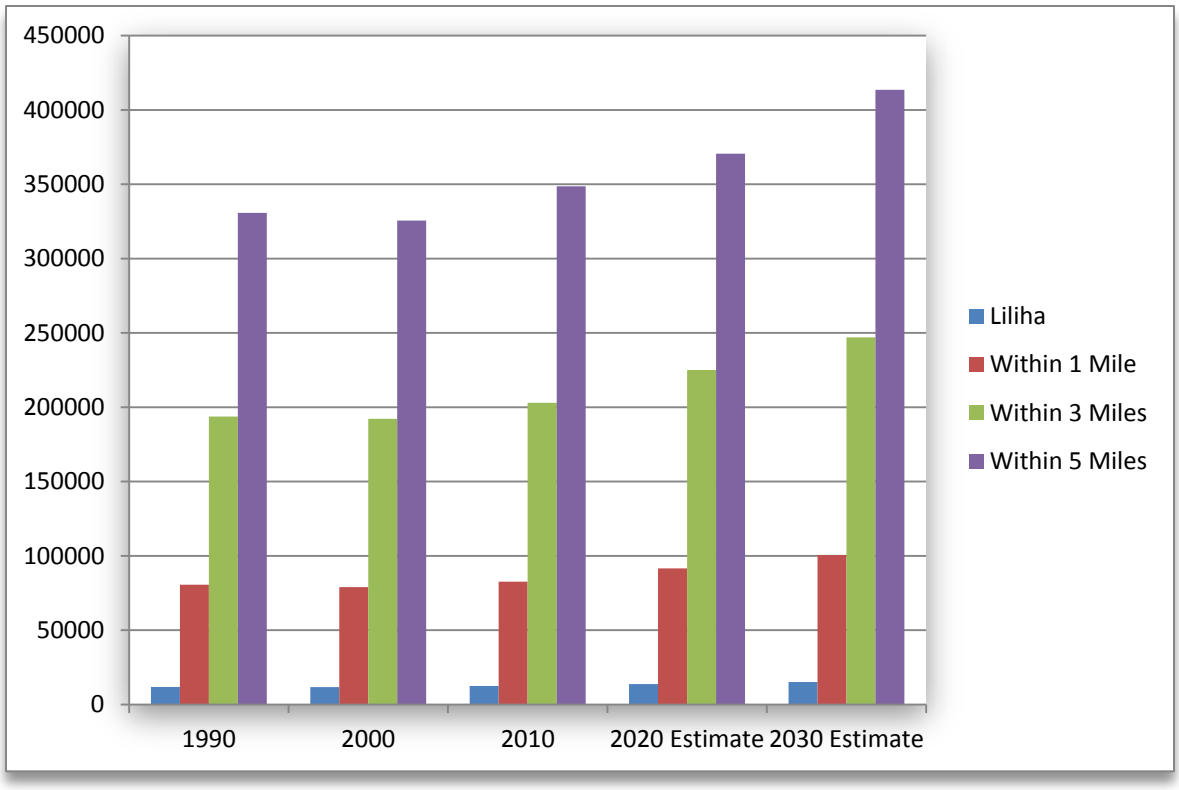


Figure 1 - Liliha Population Ring Study

84 85

The chart above shows the population of Liliha in comparison to the area within 1, 3, and 5 miles. The chart also shows the projected population growth in the areas until 2030. By considering where regional populations may stand in the future, developments proposed for Liliha can be properly sized for their completion. According to the figures, the population of Liliha is expected to rise from 11,734 in the year 2000 to 15,157 in 2030. Within 1 mile of Liliha, the population of 78,978 is expected to rise to over 100,000. The population is expected to rise by 87,890 within 5 miles of Liliha by 2030.

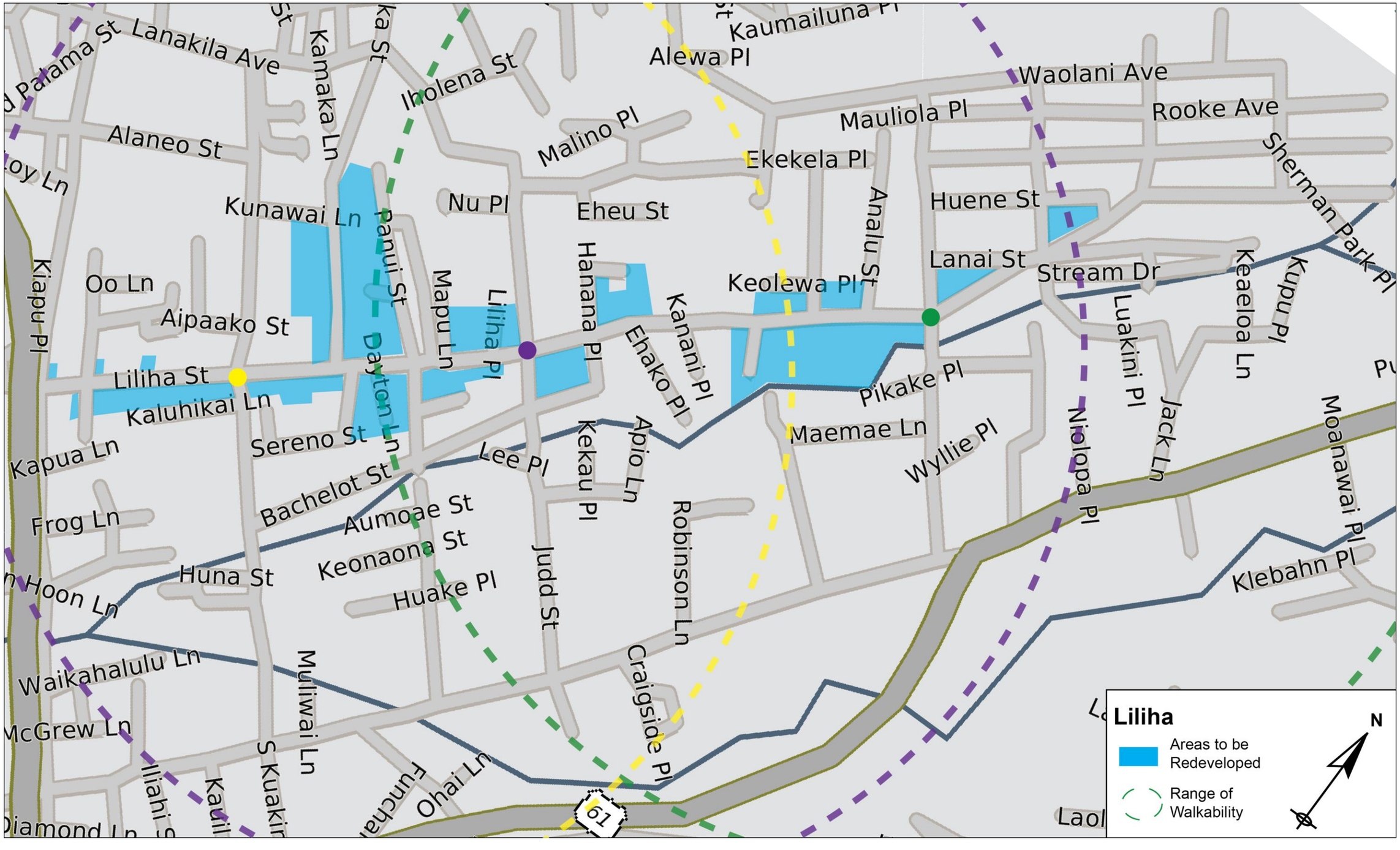
The average household size in Honolulu in 2010 was 2.42 people per housing unit[86]. With this figure in mind, Liliha should increase 1,414 units to

[84] SimplyMap [New York, NY : Geographic Research, Inc.] *US Census Data*, Retrieved Feb. 2011 from SimplyMap database. www.simplymap.com
[85] http://www.healthtrends.org/demo_pop_growth.aspx

follow population growth projections by 2030. Because nearly 88,000 additional people are expected to live within 5 miles of Liliha, there is a strong possibility for Liliha to absorb a portion of the region's expected population increase. Development strategies in this study will be contained to Liliha, but will also rely on support from population of greater regions.

A map of selected sites to re-develop is shown on the following pages. Selection of sites to re-develop will be controlled through design work and planning strategies and will vary depending on designer and site specific information. The design criteria will be specified within aims to generate similar scaled designs and building types regardless of which sites are selected within a region of re-development.

[86] **SimplyMap** [New York, NY : Geographic Research, Inc.] *US Census Data*, Retrieved Feb. 2011 from SimplyMap database. www.simplymap.com


Lanakila Ave
Kamaka St
Iholena St
Alewa Pl
Kaumailuna Pl
Waolani Ave
Rooke Ave
Mauliola Pl
Alaneo St
Malino Pl
Ekekela Pl
Sherman Park Pl
Huene St
Kunawai Ln
Nu Pl
Eheu St
Analu St
Lanai St
Stream Dr
Keaeloa Ln
Kupu Pl
Luakini Pl
Kiapu Pl
Oo Ln
Panui St
Mapu Ln
Liliha Pl
Hanana Pl
Keolewa Pl
Kanani Pl
Ehako Pl
Aipaako St
Liliha St
Kaluhikai Ln
Dayton Ln
Pikake Pl
Maemae Ln
Wyllie Pl
Niolopa Pl
Jack Ln
Moanawai Pl
Kapua Ln
Sereno St
Lee Pl
Kekau Pl
Apio Ln
Bachelot St
Frog Ln
Aumoae St
Keonaona St
Huna St
Judd St
Robinson Ln
Huake Pl
Klebahn Pl
Hoon Ln
Waikahalulu Ln
Muliwai Ln
Craigside Pl
McGrew Ln
Iliahi St
Kawili St
S Kuakini St
Funchal St
Ohai Ln
Diamond Ln
61
Liliha
Areas to be Redeveloped
Range of Walkability
N

Step Two: Determine Development

Initial re-development strategies in Liliha will be proposed to support projected demographics by the year 2030. In application, further design proposals can be created to support demographic projections further into the future. Types of developments to be added to the area can be categorized into three major groups: residential, retail, and office spaces. Park, circulation, and other civic spaces must also be considered, but exist to support local populations rather than attract them directly.

Residential Development

In many cases, adding significant residential space to an area may not be the best retrofit solution. In the case of Liliha, the nearby region's population is projected to grow significantly. If expanding population is going to be absorbed within city limits, the need for higher density living is necessary. In the process of creating more living space in Liliha, the community can be planned to provide increased benefits to its residents.

As of 2010, Liliha had a total of 3,695 housing units, most being single unit detached homes. The neighborhood's population is expected to rise to 15,157 by the year 2030[87]. Since one of the main objectives of the study is to prevent population growth from sprawling to suburbs, the amount of population growth in the area must be accounted for. This means that the projected population increase of 2,703 people in the area requires a minimum of 802 new housing units to be introduced according to Liliha's average household size of 3.37 people per household. If the average household size for Honolulu, 2.42 people per household, is used, then a minimum of 1,117 housing units should be introduced into Liliha. Population growth in nearby areas can encourage the introduction of additional residential units to Liliha.

[87] **SimplyMap** [New York, NY : Geographic Research, Inc.] *US Census Data*, Retrieved Feb. 2011 from SimplyMap database. www.simplymap.com

Housing units must also be appropriately sized for the local market. In Liliha, the average household size as of 2010 was 1,357 sq. ft.[88] With this figure, it can be determined that to match population growth estimates, Liliha should introduce a minimum of 1,088,428 sq. ft. of residential space.

To check if the amount of residential units added is reasonable for the area, case studies of successful mixed-use, walkable communities are compared. Using Table 1, a reasonable range of residential units compared to total area of developments can be determined. The amount of residential square footage relative to the total development area in the selected communities ranges from ½% to 15%. According to these guidelines, up to 4,410 housing units could be added before surpassing 15% of the total land space of Liliha.

The selected zones to introduce possible residential intervention equal a total area of roughly 1,562,000 sq. ft. – well above the required amount of 1,088,428 sq. ft. However, 359,609 sq. ft. of residential units will need to be relocated to new developments, bringing the total amount needed to 1,448,033 sq. ft. To match the density of residential space to green spaces, circulation, parking, etc. similar to Liliha's current ratio, the amount of space available will likely be less than 1,000,000 sq. ft. This means that as long as an average of 1.5 - 2 floors of residential space are developed for all selected areas, the minimum amount of housing units that are needed to prepare for population growth is met.

Similar to how Liliha requires 802 additional residential units to absorb estimated population growth, the area within 1 mile of Liliha will face the need for 5,322 housing units for 17,937 new residents. The re-development in Liliha has the ability to provide housing for the nearby region also. Using the suggested amount of residential area within a project area defined from table 1, up to nearly 6,000,000 sq. ft. of residential space can be introduced to the area. In the defined areas, an average of between 1.5 – and 6 stories of residential development are of acceptable size. For the sake of testing re-development strategies, neither the

[88] Zillow.com "Liliha Demographics" Accessed Feb. 2011

minimum or maximum amount of area required to absorb the projected regional population growth will be used. Residential unit space to be introduced will be roughly 3,000,000 sq. ft., which translates into an average of approximately 3 stories of the selected development areas. This translates into roughly 2205 housing units consistent with the average household size in Liliha.

Retail Development

Residential areas can benefit from adjacency to retail space. The amount saved by shopping locally in lost time and travel expenses can add up for an entire community. The difficulty of adding retail space to residential areas lies in the feasibility of market demands. To introduce retail developments, there must be sufficient population and demand to support businesses. This will be tested in Step Four.

According to the range of the amount of retail spaces in successful walkable communities in table 1, somewhere between ½% and 15% of total area development area can be retail space. In Liliha, this translates into a range from 119,334 sq. ft. to 3,310,038 sq. ft.

Office Development

According to the range of the amount of retail spaces in successful walkable communities in table 1, somewhere between ½% and 10% of total area development area can be retail space. In Liliha, this translates into a range from 119,334 sq. ft. to 2,206,692 sq. ft.

Step Three: Determine Population within Desired Transit Option Use

New developments in Liliha are designed to accommodate up to 1,500 radial feet of pedestrian traffic as well as vehicular and bus transit. In order to promote walkability, new developments are placed within 1,500 feet of all homes in Liliha. According to Census data, these homes accounted for 12,454 residents in 2010. That figure is proposed to climb to 17,788. In addition to residents of Liliha, commuters will likely travel to the new destination. Within 1 mile, more than 82,000 residents will be able to access Liliha via automobile or bus. Upon completion of Honolulu's mass transit system, commuters may come from even further distances. The community is designed primarily considering the residents of Liliha with the support of the large regional population.

Step Four: Run the Retrofit Formula

The Retrofit Formula is run to see if there is sufficient population within the area to support proposed developments. The formula shows how each business can profit from the regional population and how the regional population can benefit from local businesses.

From the initial planning phases, a footprint of 1,000,000 square feet of development area was created. Roughly half of that space falls within strong public corridors, such as Liliha Street, and the other half is semi-public residential areas. With this in mind, the Retrofit Formula is used to test the introduction of

500,000 square feet of retail space. Retail space includes general merchandisers, food stores, restaurants, apparel, drugs, etc.

To begin, the formula will be run using available data. Because there is already a population that needs to be considered, the answer of A is already determined. This information should be used to find missing data in the equation should some exist.

A) For total population required to support

$$\frac{\textit{Annual Sales(\$211.20/sq.ft}^{89}\textit{. * 500,000 sq.ft). [\$105,600,000]}}{\textit{(166 trips per shopper per year} * 100\% \text{ of purchases) } \textit{(\$29.15 per trip spent)}^{90}}$$

= 17,788 people available to support

Error: $105,600,000 > $86,074,353

The Retrofit Formula will not compute due to a discrepancy in the formula. The total amount spent on retail by Liliha is 86,074,353. Even if 100% of those expenses were purchased from the proposed development, it would not equal the average sales volume of retail spaces of equivalent size. There are several options to overcome the discrepancy found. The amount of proposed retail space could be decreased enough that the population of Liliha alone could sufficiently fund the businesses. Another alternative could be to increase population in the area to support the proposed retail space. The third, and most likely, solution to resolve the issue is to rely on a regional population to support the new developments. For example, considering the population within 1 mile of Liliha

[89] Newspaper Association of America, *Average Sales per Foot*. www.bizstats.com
[90] Joseph Agnese, Industry Surveys: Supermarkets & Drugstores., New York, NY: Standard & Poor's, 2010. 24

Street can change the outcome of the equation drastically. The population amount in this figure will be the estimated population within 1 mile of Liliha by 2030.

A) For total population required to support

$$\frac{\textit{Annual Sales(\$211.20/sq.ft}^{91}\textit{. * 500,000 sq.ft). [\$105,600,000]}}{\textit{(166 trips per shopper per year} * 21.52\% \text{ of purchases) } \textit{(\$29.15 per trip spent)}^{92}}$$

= 100,574 people available to support

The solution above shows a possible solution to fund the retail spaces. Roughly 100,000 people were found to spend roughly 480 million dollars per year on retail items[93]. Using the formula, it can be determined that the population will need to spend roughly 21.52% of their annual shopping trips in the new retail spaces. This is a reasonable amount considering that residents near the retail spaces will likely exceed that percentage and shoppers from further than one mile will likely be attracted as well. Equation A can be used to show the expected usage in different areas as well if desired.

B) For total household units needed:

[91] Newspaper Association of America, *Average Sales per Foot*. www.bizstats.com
[92] Joseph Agnese, Industry Surveys: Supermarkets & Drugstores., New York, NY: Standard & Poor's, 2010. 24
[93] Joseph Agnese, Industry Surveys: Supermarkets & Drugstores., New York, NY: Standard & Poor's, 2010. 24

Result A [100,574 people]/ Average Household size [2.64][94]

=38,096 households

The figure used is for the expected population within 1 mile of Liliha. This figure is divided by the average household size in Honolulu. The figure can be beneficial when being used to determine how many household to include in development.

C) To determine density to support average new establishments:

C2 would be used because the amount of population needed to support retail spaces exceeds the population within reasonable walking distance

Population density does not need to be calculated in situations where the regional population being used is not available to change. Determining population density can help determine the size of residential units to support proposed retail spaces. If density is not sufficient and can not be changed, the size of the retail space must be altered.

I.) Total dollars saved to average consumer from new amenity

[94]SimplyMap [New York, NY : Geographic Research, Inc.] *Census 2010 Projections*, Retrieved FEB 2011 from SimplyMap database. www.simplymap.com

(*Average trips to similar [166] * 21.52% * Average trip time [0.21hours]*[95] *
Average hourly wage [18.96][96] ** 2 [to and from store]*

=$143.43

+

*((Average trips to similar [166] * 21.52% *Average trip distance (1.4 miles*[97]*) /*
*average miles per gallon [24.6]) * Average gas price [4.14]*[98]*)*

** 2 [to and from store]*

=$16.83

= Total amount of dollars saved by community member

=$160.26

(Excluding traffic and stress factors)

According to time that is lost traveling and gas prices, the above amount is the amount of cost benefit to residents of Liliha after proposed retail spaces are introduced. It can be argues that cost factors attributing to stress, wear on vehicles, etc. can inflate the cost benefits even further. This cost benefit is applied to anyone that shops at the retail stops for 21.52% of all purchases in minimal time with no travel expenses. Pedestrians or passing by vehicles are likely to achieve this scenario.

[95] Cheryl Brown and Borisova, Tatiana, Understanding Commuting and Grocery Shopping Using the American Time Use Survey. Washington, DC 2007
[96] United States Bureu of Labor and Statistics, Establishment Data: Earning. Washington, DC 2010
[97] Cheryl Brown and Borisova, Tatiana, Understanding Commuting and Grocery Shopping Using the American Time Use Survey. Washington, DC 2007
[98] U.S. Energy Information Administration, Monthly Energy Review April 2010

II.) Total distance less traveled

*Average Household size [3.5] * Total number of households defined in region B [3556] * average trips to similar [166] * average distance to similar [1.4] * x [21.52%] * 2*

= total distance less traveled by community [627,612 miles]

According to this calculation, it is possible for Liliha to remove up to 627,612 miles driven by automobiles per year by walking to new retail spaces 21.52% of all retail shopping trips. This is not only beneficial to lowering congestion on roadways, but it reduces carbon dioxide emissions and reduces gasoline consumption. The benefits of a walkable community are vast. Reducing the usage of automobiles can help communities to unlock the benefits.

III.) Estimated contribution to community annually in dollars

*Average household size [3.5] * number of households in defined region B [3556] * I. [$119.15]*

= Total amount of dollars contributed to community [$1,482,940]

(Excluding property values)

Factoring the cost benefits to the entire community of Liliha shows that the existing residents can share a cost benefit up to over 1 million dollars annually. This savings to the community can help improve the economy of the area. Also,

cost benefits are likely to occur in property values. This amount does not factor increased property values.

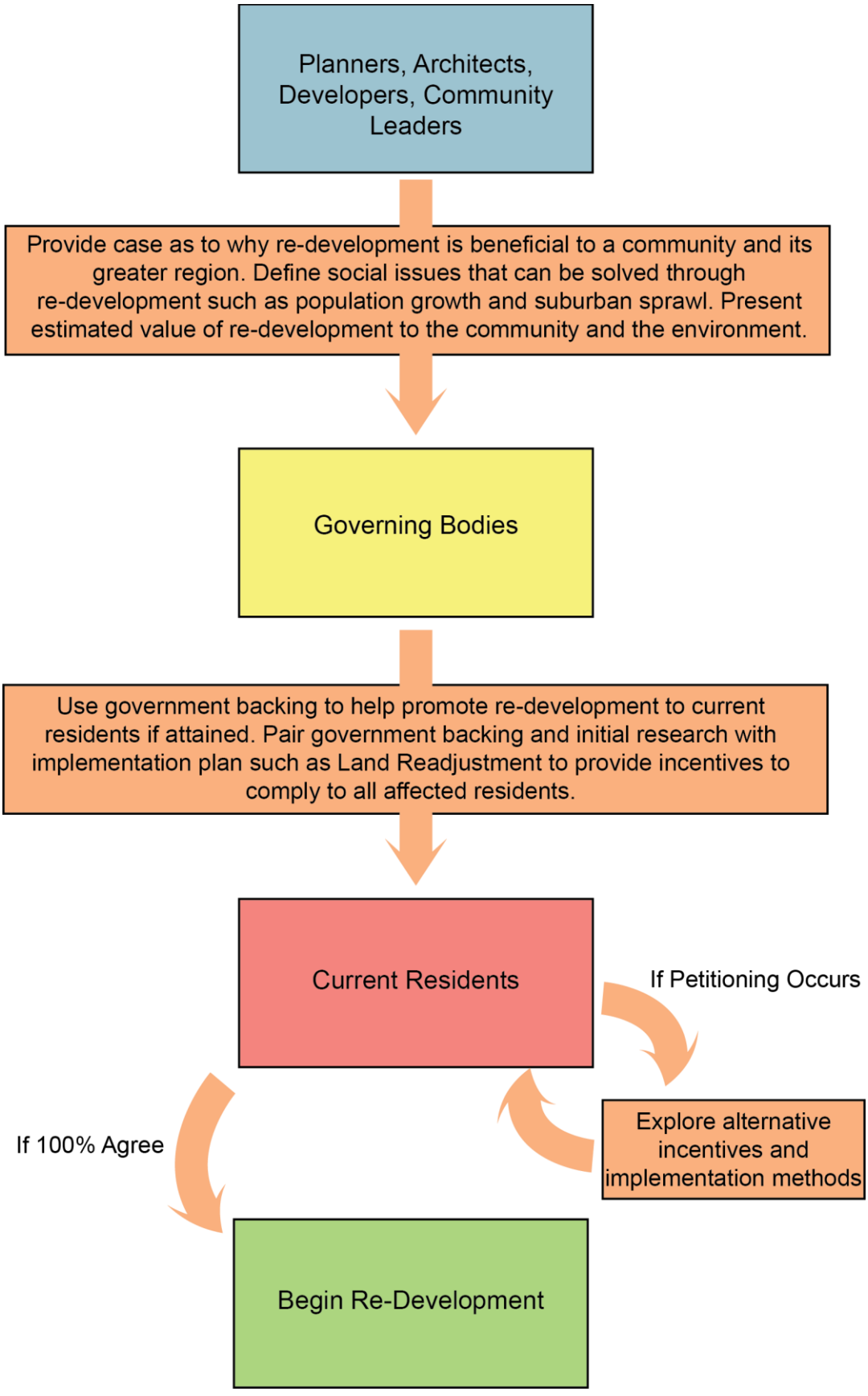
Step Five: Present Data to Public Using Dollar Figures

Presenting data to the public can help open the doors for implementation by showing residents how they can benefit from re-development. By introducing 500,000 square feet of residential space to Liliha, the community can benefit by as much as $1,482,940 annually. If the public can be persuaded that re-development is ultimately for their benefit and the benefit of their communities, they are more likely to support re-development strategies.

In addition to the cost benefits, there are over a half million miles that will be less traveled by automobiles in Liliha as a result. This figure can help gain the support of advocates of sustainability and walkable communities. Calculating the benefit to the environment can be done as well to gain the support of ecological groups. With wider-ranging support, there is a greater chance for a project to proceed towards implementation.

Part 2: Implementation Methods

Implementation of a suburban retrofit can be a difficult process. Because of the obstacles that need to be overcome, greenfield and sprawling developments are often a simpler development model to follow than urban or suburban re-development. This document is designed to provide the tools needed to overcome the obstacles of suburban or residential re-development and implement new design strategies. The process of application to follow can be seen best in the implementation flowchart on the next page.


Planners, Architects, Developers, Community Leaders
Provide case as to why re-development is beneficial to a community and its greater region. Define social issues that can be solved through re-development such as population growth and suburban sprawl. Present estimated value of re-development to the community and the environment.
Governing Bodies
Use government backing to help promote re-development to current residents if attained. Pair government backing and initial research with implementation plan such as Land Readjustment to provide incentives to comply to all affected residents.
Current Residents
If Petitioning Occurs
Explore alternative incentives and implementation methods
If 100% Agree
Begin Re-Development

Following the flowchart, initially, a case must be made that re-development is necessary. In the plan to re-develop Liliha, numerous reasons were found to persuade governing bodies to provide the project with funding.

In order to prevent sprawl onto Oahu's remaining greenfield sites, existing communities will need to prepare for population growth. By re-developing Liliha, the project has the ability to accommodate a portion of the increasing demand for homes in Honolulu. In the process of densifying the area out of necessity, public use areas can be incorporated to enrich the community in ways based on Smart Growth and New Urbanist principles.

Not only will Liliha's proposed developments serve the demands of population increase, but the existing community will also benefit. It is calculated that roughly $600,000 per year can be relayed to the community in cost benefits for after the construction of proposed developments.

In addition to cost benefits, the environment can be improved by creating a walkable community. It is estimated that if current residents of Liliha support new local developments as a pedestrian, the community can remove over a million miles of travel by automobile per year. Fewer vehicles on the roads lead to less traffic congestion and less carbon dioxide in the air.

With all of the reasoning developed in Part 1 of the project, governing bodies may find the proposal worthy of an ordinance such as a designated community facilities district. This can help developers invest in projects because the ordinance allows collateral of a project to be invested into its development.

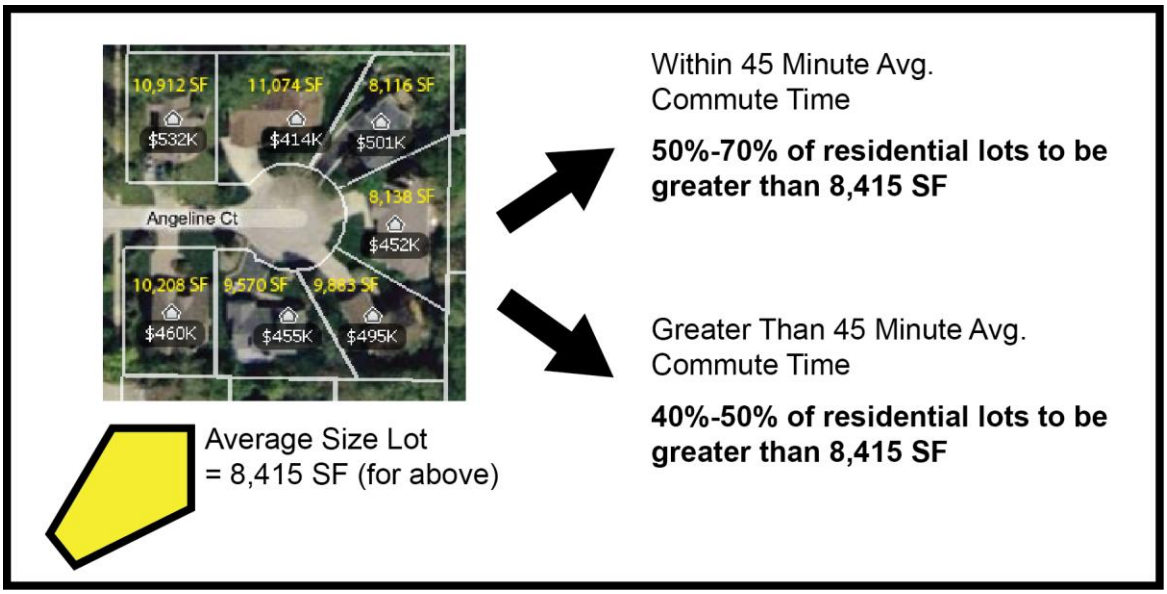
Residents and property owners of land that will be re-developed need to then agree to re-development. One strategy that can be employed to encourage these groups to agree is land readjustment. In this scenario, property owners in Liliha would be given the option to become part-owners of the development in exchange for their land and the hardships they will endure as part of the re-development process. Additional backing for the project can then be funded by equity gained from the increased value of properties after re-development.

If residents refuse to agree to the terms of re-development, additional incentives and implementation methods should be explored to help move the project forward. If no other option is successful, land may need to be attained through condemnation. This is only an option if a small minority refuses to support the project and no other alternative is effective.

Part 3: Design Using Architectural Guidelines

The design of Liliha is based on the principles of Smart Growth and New Urbanism. In addition to the design guidelines provided by each organization, architectural form was considered using newly created design guidelines. The additional guidelines that were used were based on statistical data to help guide developments to efficient scaling.

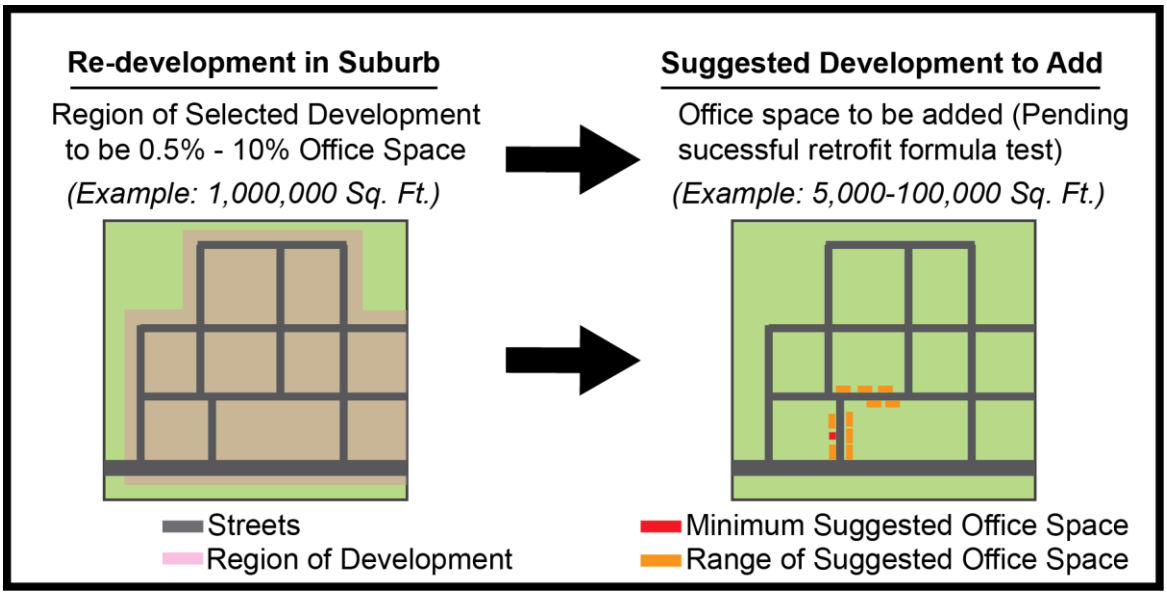
R1) Large Lot Homes - The total footprint of the area of residential development was to be 40%-70% dedicated to single family homes on large lots. “Large lot” homes refer to surpassing average lot sizes within a proposed development area. Since commute times in Liliha are lower than 45 minutes, large lot homes should account for between 50%-70% of the total number of homes.



With only 1,000,000 total square feet of living space to be re-developed, the large lot homes of Liliha exceed 50% of the total land space. This satisfies the rule. The rule is not included in many mixed use community standards because increasing density instead of creating sprawling developments is a goal of the projects. It is important to consider that many consumers prefer large lot

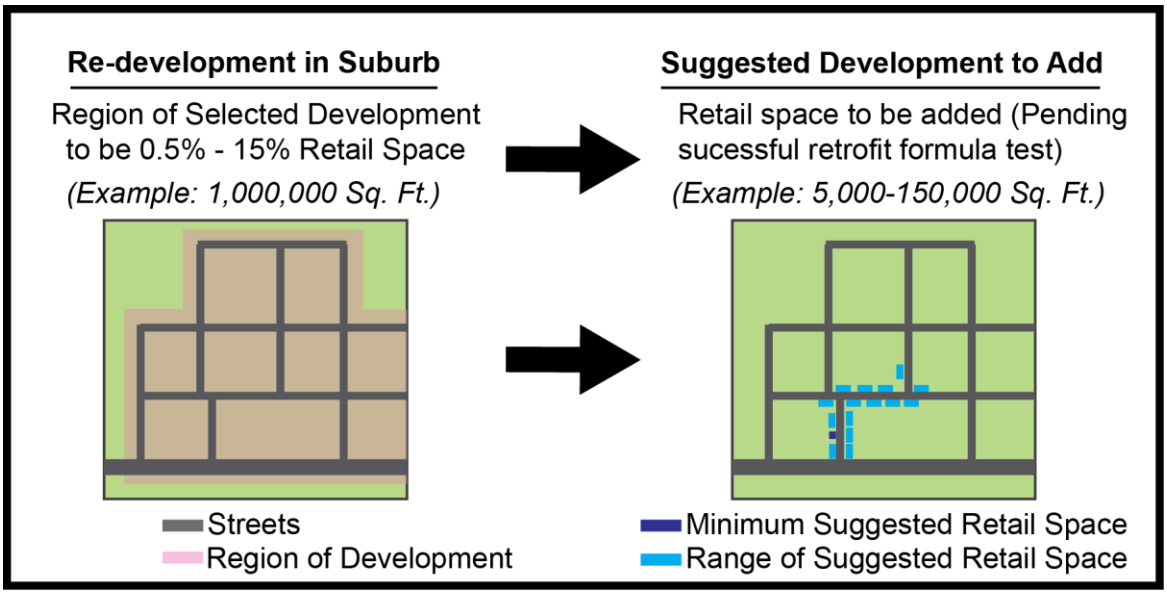
homes and they should be incorporated in re-developments to give consumers large lot homes in a setting alternative to sprawl.

C1) Office Space Requirements



Office space is proposed within the specified range set by successful case studies. 500,000 sq. ft. of office space is proposed in the Liliha development.

C2) Retail Space Requirements



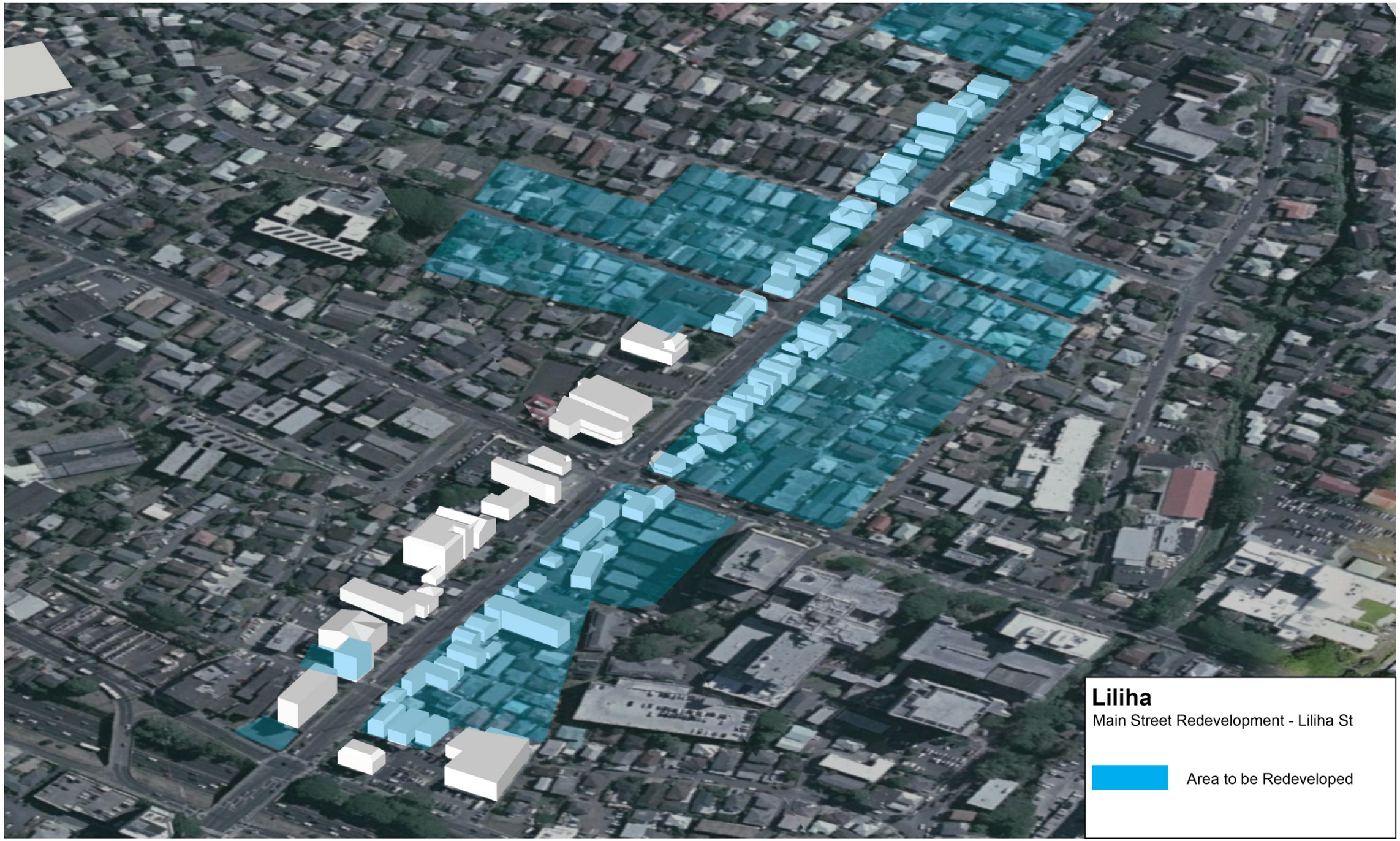
Office space is proposed within the specified range set by successful case studies. 500,000 sq. ft. of retail space is proposed in the Liliha development.

X1) Re-development Capacity

Determining the capacity of re-development can help prevent over-developing or under-developing. This research has established the Retrofit Formula as the guide to determine if there is sufficient regional population to support proposed developments. If there is not, the formula suggests scaling the proposal or introducing greater population to the area. If a system is not used to estimate if a development has the local support for success, then it runs the risk of failing.

In Liliha, it was calculated that the population within walking distance to the new developments is insufficient. By assuming residents would likely commute by car within one mile, it was determined that the new developments would receive sufficient business if residents shop at the new developments for 21.52% of their total retail purchases.

The developments to be introduced to Liliha are designed according to these architectural guidelines and the principles of Smart Growth and New Urbanism. Before and after images are shown to illustrate how residential re-development can change the atmosphere of communities in a positive manner.


Liliha
Main Street Redevelopment - Liliha St
Area to be Redeveloped


Liliha - Master Plan
Primary Zone of Re-development
Public Park
New Residential Unit
New Mixed-Use Unit
N
Kuhawai Ln
Nu Pl
Eheu St
Kedewa Pl
Huene St
Lanai St
Stream Dr
Alapaaka St
Liliha St
Kaluhika Ln
Kapua Ln
Serena St
Bachelot St
Aumoae St
Keonaona St
Huake Pl
Huna St
Hoon Ln
Waikahaluulu Ln
Judd St
Robinson Ln
Pikake Pl
Maemae Ln
Waolani Av
Mauliola Pl
Ekekela Pl
Alewa Pl
Malino Pl
Kaumaha
Lanakila Ave
Alaneo St
Kaai Pl
Niniau Pl

1) Existing Site

Liliha
Redevelopment at Liliha St. & Ekekela Pl.

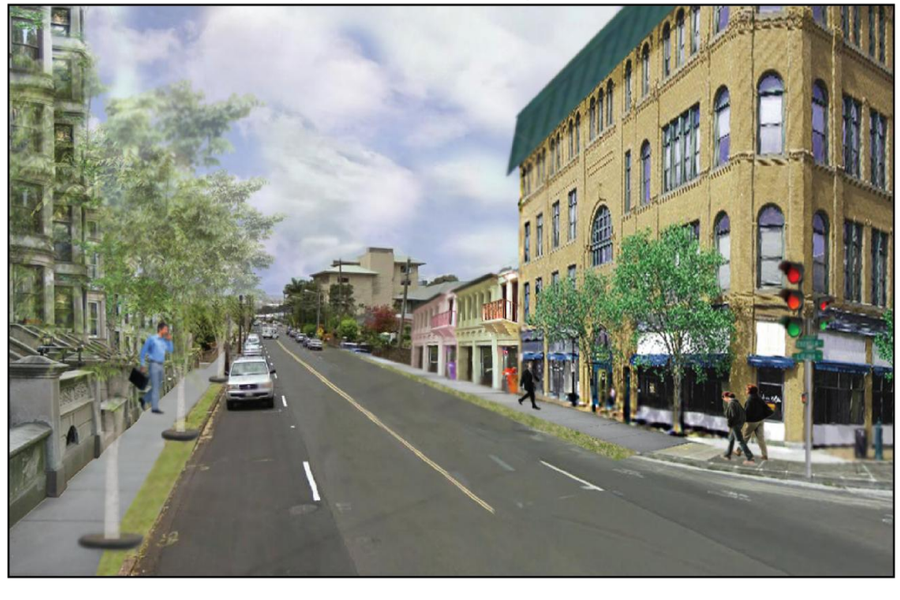
2) Relocation of Utility Lines, Sidewalk Introduction

3) Establish Buffer Between Sidewalk and Street

4) Increased Residential Units

5) Increased Residential / Office / Retail Space

6) Introduction of Shops and Residential or Office Lofts



1) Existing Site

Liliha
Redevelopment at Liliha St.

2) Relocation of Utility Lines

3) Establish Buffer Between Sidewalk and Street

4) Increased Commercial Space

5) Increased Office / Retail Space

6) Introduction of Shops and Residential or Office Lofts

1) Existing Site


Kuawa St
Kuakini St
Liliha St
Pikake Pl
Maemae Pl
Kaiwa Pl
Kaiwa Ln
Kaiwa Dr
Kaiwa Ct

1) Existing Site

Liliha
Redevelopment at Liliha & Panui St.

2) Relocation of Utility Lines

3) Establish Buffer Between Sidewalk and Street

4) Increased Commercial Space

5) Increased Office / Retail Space

6) Introduction of Shops and Residential or Office Lofts

1) Existing Site

Liliha
Redevelopment at Liliha & Kunawai St.

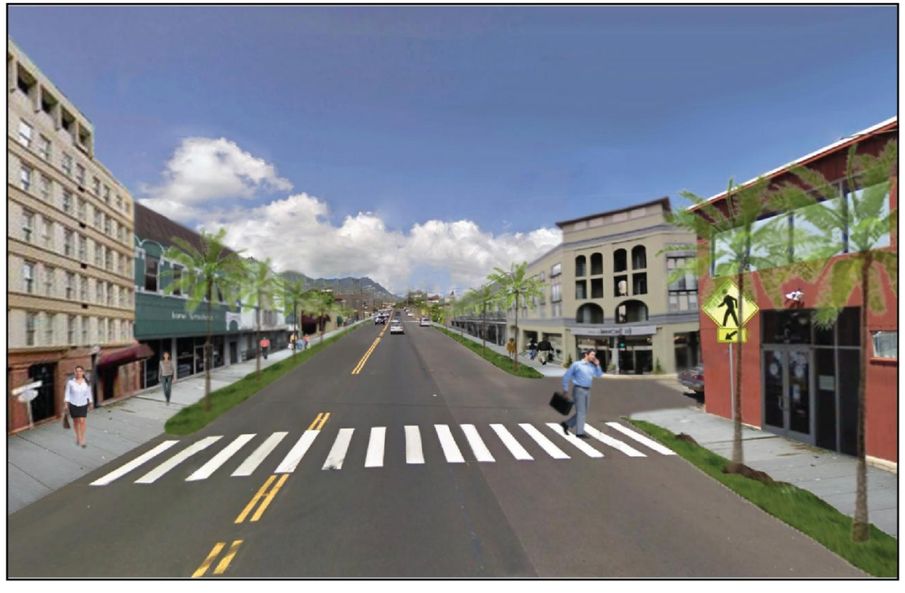
2) Relocation of Utility Lines

3) Establish Buffer Between Sidewalk and Street

4) Increased Mixed Use Space, Building Revitalization

5) Increased Office / Retail Space

6) Introduction of Shops and Residential or Office Lofts



1) Existing Site

Liliha
Redevelopment at Liliha & Kunawai St.

2) Relocation of Utility Lines

3) Establish Buffer Between Public and Private Space

4) Increased Mixed Use Space, Building Revitalization

5) Increased Residential Space

6) Introduction of a Variety of Residential Spaces Leading to Park Space

1) Existing Site

Liliha
Redevelopment at Liliha & Halapia St.

2) Relocation of Utility Lines

3) Establish Buffer Between Street and Sidewalk

4) Increased Mixed Use and Residential Space

5) Increased Mixed Use Space

6) Increased Office / Retail / Residential Spaces

i) Conclusion

Using the techniques to retrofit residential communities for community growth, communities have the option of expanding, according to changing demographics, while maintaining their identity. In the example performed in Liliha, retrofitting the neighborhood was possible while retaining some of the most attractive features of the area. Over 80% of large lot homes were retained in the community as well as 100% of schools, parks, medical, and civil structures. In addition to these public spaces, successful comercial units and medium density housing units were also retained. The idea that suburban communities do not need to completely change to have a role in mixed use practices is demonstated in the Liliha retrofit.

Through the three part re-development strategy, communities are able to grow into more walkable, healthier, and social environments while boosting local economy and reducing reliance on automobiles. The ability of the described

retrofit strategies to apply to suburban communities allows the expansion mixed use practices to permeate into the suburbs.

Planning, implementation, and architectural techniques were described with objective of improving existing efforts of alternative community design. Through new planning techniques and considerations such as the Retrofit Formula, cost benefit analysis can be projected for new businesses and existing residents. Several systems of amalgamating land and implementing plans are introduced with the idea of creating a comprehensive guide for communities to implement their retrofit plans. The architectural guidelines required to create successful mixed use communities were also described and built upon according to the characteristics of suburban settings.

Through all of the information that is outlined in this project, communities are given the necessary tools to help guide re-development efforts. Not only can communities utilize the body of work within this project, but also planners, developers, architects, governing bodies, etc. can use the information for their benefit. They can use the tools to help guide the development of America's suburbs to their next role in society. This can help suburbia evolve over time without being destroyed and rebuilt or sprawling further from primary urban centers.

By changing the suburbs into communities that also have a walkable element, many of the negative aspects against sprawl can be eliminated. The amount of time waiting in traffic and the general reliance on automobiles can be reduced if an option to walk to points of interest is possible. The possible health benefits of a more active lifestyle and the value of nearby commercial and civic spaces to properties is enough for neighborhoods of suburban sprawl to consider re-development. The value of this body of research reveals that suburbia can support many of the benefits of dense mixed use communities while retaining their suburban identity. This not only can help the communities of suburbs grow, but also can prepare the suburban genre as it is known for community growth.

Appendix A:

Re-Development and Mixed-Use Information Table

PLACE	BEFORE	AFTER
LAKEWOOD, CO (BELMAR) All Excerpts from: (http://www.belmarcolorado.com/about.php)	120 acre auto dependent, private "dead" mall	-Urban, walkable, and bus-served mix of uses and public spaces. Also serves as downtown, with a range of housing types, variety of cultural activities, and shopping. -4,000 free spaces of parking in conveniently located garages and surface lots. Over 250 on-street spaces. -The 22-block area, which once housed Villa Italia Mall, hosts 67 percent national retailers and 33 percent percent local or franchised retailers. By its 2011 completion, it will have 1 million square feet of offices, 175 retailers and 1,300 condos, row homes and lofts. -Projected 1,500 residents
CELEBRATION, FL All Excepts from: http://www.celebration.fl.us/towninfo.html	Rural Site	- Developed by Walt Disney Corp. - 9,000 residents - 4,060 dwelling units - 94,000 sq. ft. commercial space - 4,900 acre development surrounded by 4,700 acres of preserved land
SEASIDE, FL All Excepts from: (http://www.seasidefl.com) (http://www.theseasideinstitute.org/item/8840)	Greenfield	- 335 single family homes - 25 multi-family units - 26 live-work units - 80 acre site - 95,630 sq. ft. commercial space - 10% of residents stay year round

STAPLETON, CO

		styles - 24th Denver Public Library - $20,199 average increase in Stapleton home values 2007-2009

PEARL ST., CO All Excerpts from: (http://www.boulderdowntown.com)	Old downtown for mining/mountain community	- The premier business, cultural and entertainment destination in the Colorado Front Range - Downtown Boulder is home to 6 parking structures and 5 parking lots, along with on-street metered spaces -- over 4,000 parking spaces
BIRKDALE, NC All Excerpts from: (http://volusia.org/growth/smartgrowth/50.%20Birkdale%20Village%20Huntsville%20NC.pdf)	52-acre Area that lacks sense of place and community	Birkdale Village contains 320 apartments, 300,000 square feet of retail space, and 200,000 square feet of office space. The 52-acre site thus has a gross residential density of 6.2 units per acre. -Site area (acres/hectares): 52/21 -Mixed-use buildings: 18 -Apartment buildings: 3 -Total dwelling units: 320 -Junior anchors: 5 -Outparcels: 5 -Total parking spaces: 15,500

HARTFORD, CN All Excerpts from: (http://www.planetizen.com/node/44254)	- Downtown Hartford consisted of a dense network of medium-rise, mixed-use buildings, which supported a vibrant economy built on insurance and precision manufacturing - In 1960 the fabric of the downtown core was still largely intact, with only 15,000 parking spaces	- The roughly 46,000 parking spaces in the city today include 21,000 spaces in surface parking lots and another 21,000 in parking garages – in total, 22 percent of the land area downtown is devoted to parking.
FALL CREEK PLACE, IN (http://www.fallcreekplace.com/index.php?module=content&func=view&pid=1)	As recently as 2000, the neighborhood was known as "Dodge City" because of its high crime rate. While many families continued to live in the area, vast portions of the neighborhood were comprised of vacant lots and boarded-up homes--the result of decades of disinvestment.	There are currently nearly 400 homes in Fall Creek Place, and is expanding to include approximately 110 additional new homes. Half of all homes sold in Fall Creek Place were sold as affordable homes, meaning the buyers earned at or below 80% of the City's median income. The neighborhood will add $1.2 million to the local tax base. The neighborhood is much "greener" than before, with one new city park, three new neighborhood parks and a new linear greenway along Fall Creek. $15 million of public infrastructure improvements brought completely new sidewalks, street and alley resurfacing, historic lighting, tree planting and buried utilities. Fall Creek Place is a partnership between the City of Indianapolis and King Park Area Development Corporation.

SOUTHER VILLAGE, NC All Excerpts from: (http://www.southernvillage.com/)	a 300-acre site of mostly rural land close to UNC and Chapel Hill's downtown	Roughly 230 acres are developed and the remaining 92 acres are in open space, greenway and park land. This mixed use neighborhood has 1,150 residential units, presenting a variety of types and styles: 530 single family homes, 250 apartments, 230 condominiums and 140 town homes. Residential lofts are located in the Village Center above retail stores. One Village Center building is entirely condominium homes. The housing closest to the Village Center is multi-family. Outside this ring of attached housing are the single-family homes. Surrounding it are two- and three-story buildings that vary in architectural style and include the retail stores, offices and lofts. Market Street has 252,500 square feet of retail and office space.
Crawford Square, PA All Excerpts from: (http://www.urbandesignassocites.com/project_Detail.asp?ProjctMainID=25&Section=2) (http://www.designadvisor.org/gallery/crawford.html)	A vacant urban wasteland; the rebuilding maintained the basic form of a traditional neighborhood and included a mix of small apartment buildings, townhouses, and single-family houses	**DEVELOPMENT PROFILE** Type /Units Size (. BR .01 574-7 ? BR .55 862-1 3 BR .8 .,205 3 & 4 BR(for-sale) 57 .,940 **Total 831** Community/play: 2,500; pool/deck ot - 750 Parking: 304, surface Total Site Area: 10.4 acres DENSITY: 16.2 units per acre.
FRUITVALE VILLAGE, CA	a distressed neighborhood, characterized by	A 257,000 square foot “transit village” built on former BART parking lots.

All Excerpts from: (http://www.fruitvalevillage.net)	high density, high unemployment, a large percentage of households below the poverty line, and a high crime rate	An active, retail-lined connector between the BART station and the neighborhood's primary retail artery. This Pedestrian Street and plaza also serve as a major community-gathering place. Forty-seven units of mixed-income housing. 114,000 square feet of community services (clinic, library, senior center) and office space (including the Unity Council's headquarters). 40,000 square feet of neighborhood retail (shops and restaurants). 150 car parking garage within the buildings (plus a large parking structure for BART).
HERCULES WATERFRONT DISTRICT, CA (http://www.herculeswaterfront.com/index.htm)	The site has been designated as the Historic Town Center of the City of Hercules, founded in the 1840's as a company town for the Hercules Powder Company, a manufacturer of explosives used in the Gold Rush and the construction of the western railroads. From the 1960's through the 1990's, Hercules grew in residential population as a bedroom community, but did not attract high-quality commercial or mixed-use	It consists mainly of three-story buildings, with some four- to five-story buildings housing residential/office uses above retail.(21 acres, mixed-use zoning , 140-165 live-work units, 35-50 apartments and/or condos , 75,000-95,000 sf commercial space, 30,000-60,000 sf civic space) - The second phase of residential construction is in the form of a village, entirely surrounded by natural open spaces including creeks and wetland preservation areas. The neighborhood is characterized by narrow, tree-lined streets with more rural detailing than those of the Central Neighborhood, providing walking, biking and jogging pathways along the open space edge. (10 acres, single-family zoning, 78 single-family lots, 64

	development that would establish a center for the City, or a downtown.	cottages: 1,400-1,830 sf, 14 townhouses: 1,500-1,750 sf- 12 affordable units) -The Central Neighborhood covers approximately 47 acres and is characterized by narrow, tree-lined streets and traditional houses with front porches. All of its 207 houses are single-family residences, 33 of which have ancillary units at the back of their lot. All lots face directly onto the streets, and most of them are given vehicular access through alleys. Regulations for this neighborhood require that the houses be designed in characteristic of the Bay Area. It also includes a public park constructed around an existing wild pond. (47 acres, single-family zoning, 217 single-family lots, Lots from 3,000-5,500 sf, Houses from 1,700-3,200 sf) -The Transit Village, covering an area of about 22 acres includes 450 residences in a downtown neighborhood setting. The buildings will be three stories in height, and will include one- and two-bedroom apartments, flats and, two-story town house units. Most ground floor units will face the narrow tree-lined streets with front porches or stoops, while upper floor units will be accessed from balconies at the rear. Parking for inland buildings will be located in garages and parking lots at the rear of the buildings, while parking for the Bayfront buildings will be in secured parking levels below the apartments.(16 acres, multi-

		family zoning, 420-460 apartments, Mixed-use center at corner)

Appendix B:
Index of Possible Funding and Supporting Programs

ORGANIZATION & PROGRAM	QUALIFICATIONS	WHAT DOES IT PROVIDE
<u>FHA Section 221(d)(3) & 221 (d)(4)</u> *All Excerpts From:* *http://www.hud.gov/offices/hsg/mfh/progdesc* */rentcoophsg221d3n4.cfm*	Public, profit-motivated sponsors, limited distribution, nonprofit cooperatives, builder-seller, investor-sponsor, and general mortgagors. Insured mortgages may be used to finance the construction or rehabilitation of detached, semidetached, row, walkup, or elevator-type rental or cooperative housing containing 5 or more units. The program has statutory mortgage limits which vary according to the size of the unit, the type of structure, and the location of the project	Insures mortgage loans to facilitate the new construction or substantial rehabilitation of multifamily rental or cooperative housing for moderate-income families, elderly, and the handicapped. Section 221 (d)(3)- nonprofit sponsors or cooperatives may receive an insured mortgage up to 100 percent of HUD/FHA estimated replacement cost of the project. Section 221(d)(4)- all types of sponsors can receive a maximum mortgage of 90 percent of the HUD/FHA replacement cost estimate

HUD 108 Loan	Metropolitan cities and urban counties (i.e. CDBG entitlement recipients); nonentitlement communities that are assisted in the submission of applications by States that administer the CDBG program; and nonentitlement communities eligible to receive CDBG funds under the HUD-Administered Small Cities CDBG program (Hawaii). The public entity may be the borrower or it may designate a public agency as the borrower. Activities eligible for Section 108 financing include: economic development activities eligible under CDBG; acquisition of real property; rehabilitation of publicly owned real property; housing rehabilitation eligible under CDBG; construction, reconstruction, or installation of public facilities (including street, sidewalk, and other site improvements); related relocation, clearance, and site improvements; payment of interest on the guaranteed loan and issuance costs of public offerings; debt service reserves; public works and site improvements in colonias; and in limited circumstances, housing construction as part of community economic	Communities with a source of financing for economic development, housing rehabilitation, public facilities, and large-scale physical development projects. It allows them to transform a small portion of their CDBG funds into federally guaranteed loans large enough to pursue physical and economic revitalization projects that can renew entire neighborhoods.

All Excerpts From: *http://www.hud.gov/offices/cpd/* *communitydevelopment/programs/108/*	development, Housing Development Grant, or Nehemiah Housing Opportunity Grant programs.	
HUD Section 811: Capital Advance Program	Nonprofit organizations with a Section 501(c)(3) tax exemption from the IRS can apply to develop a Section 811 project if they can, among other requirements, submit a resolution that they will provide a minimum capital investment equal to 0.5 percent of the capital advance amount, up to a maximum of $10,000.	Interest-free capital advances to nonprofit sponsors to help them finance the development of rental housing such as independent living projects, condominium units and small group homes with the availability of supportive services for persons with disabilities. The capital advance can finance the construction, rehabilitation, or acquisition with or without rehabilitation of supportive housing. The advance does not have to be repaid as

All Excerpts From: *http://www.hud.gov/offices/hsg/mfh/progdesc/* *disab811.cfm*		long as the housing remains available for very low-income persons with disabilities for at least 40 years. Project rental assistance; this covers the difference between the HUD-approved operating cost of the project and the amount the residents pay--usually 30 percent of adjusted income. The initial term of the project rental assistance contract is 3 years and can be renewed if funds are available.
<u>Calvert Foundation Loan</u>	Community organization that serves as a financial intermediary and are in need of flexible, affordable capital, and meets following requirements: -Three years of operating experience. We do not typically lend to start-up organizations. -A solid base of net assets or net worth. As general recourse lenders, we look to an organization's net assets or equity base as a possible source of repayment. Loan candidates should have sufficient equity available to	Calvert Foundation lends to more than 250 community organizations, including loan funds, microfinance institutions, affordable housing developers and social enterprises. Through their work, we are building strong, healthy communities. $50,000 to $2.5 million; loans are limited to 10% of applicant's total assets

All Excerpts From: *http://www.calvertfoundation.org/who-wehelp/criteria*	cover their desired loan several times over. Evidence of good operating performance**.** Loan candidates should demonstrate a minimum level of self-sufficiency by posting positive net income for the past two fiscal years. -Audited financial statements. Loan candidates should be able to provide audited financial statements with notes for the past three years of operation. -Debt capital. Loan candidates should have a track record of raising and repaying debt capital.	
<u>City of Honolulu- CBED Program</u> <u>(Empower Oahu)</u> *All Excerpts From:* *www.honolulu.gov/dcs/specialprojects/cbed.htm*	community economic development organizations	Matching city funds at $7 for every City $1 invested. Attracts almost $6.5M from other sources Creates or retains over 175 jobs. Creates or expands over 115 businesses.
<u>HUD- HOME Investment Partnership Program</u>	States are automatically eligible for HOME funds and receive either their formula allocation or $3 million, whichever is greater. Local jurisdictions eligible for at least $500,000 under the formula ($335,000 in years when Congress appropriates	HOME is the largest Federal block grant to State and local governments designed exclusively to create affordable housing for low-income households. Each year it allocates

All Excerpts From: *http://www.hud.gov/offices/cpd/affordable* *housing/programs/home/*	less than $1.5 billion for HOME) also can receive an allocation. Communities that do not qualify for an individual allocation under the formula can join with one or more neighboring localities in a legally binding consortium whose members' combined allocation would meet the threshold for direct funding.	approximately $2 billion among the States and hundreds of localities nationwide.
<u>HUD CDBG Program</u>	A grantee must develop and follow a detailed plan that provides for and encourages citizen participation. This integral process emphasizes participation by persons of low or moderate income, particularly residents of predominantly low- and moderate-income neighborhoods, slum or blighted areas, and areas in which the grantee proposes to use CDBG funds.	annual grants on a formula basis to 1209 general units of local government and States. HUD determines the amount of each grant by using a formula comprised of several measures of community need, including the extent of poverty, population, housing overcrowding,

All Excerpts From: *http://www.hud.gov/offices/cpd/* *communitydevelopment/programs/*	CDBG funds must be used for activities that benefit low- and moderate-income persons. In addition, each activity must meet one of the following national objectives for the program: benefit low- and moderate-income persons, prevention or elimination of slums or blight, or address community development needs having a particular urgency because existing conditions pose a serious and immediate threat to the health or welfare of the community for which other funding is not available.	age of housing, and population growth lag in relationship to other metropolitan areas.
HPHA- Low-Income Housing Tax Credit Program	Any individual, corporation, partnership, trust or other legal entity can utilize low-income housing tax credits if it has sufficient taxable income to be offset by the credits. Individuals may be limited in the amount of credit they are eligible to use (check with your tax accountant). Non-profit organizations who have an ownership interest in a low-income housing project or owners with minimal tax liability may also utilize the tax credit by raising equity for their project through the sale of the credits.	for private developers and non-profit entities to construct or rehabilitate affordable rental units. Federal and state tax credits may be used to obtain a dollar-for-dollar reduction in income tax liability for 10 years or to obtain equity for a project through syndication of the credits. The program offers tax benefits of approximately $1.8 million each year, in

	To qualify for a tax credit, owners must meet these general guidelines : Only for units rented to low-income occupants. Low-income rents, including utilities, are restricted based on the number of bedrooms in the unit and the area median income as established annually by HUD. The area median income varies in each county. Area median income limits are adjusted for family size. The project must comply with the above rental restrictions for at least 18 years. Owners must recertify the income of low-income occupants each year.	addition to unused carryover credits from the previous year, to owners of low-income housing in Hawaii. 10% of this amount is reserved for non-profit organizations.

All Excerpts From: *http://hcdch.state.hi.us/HOUSINGPROGRAMS/* *lihtc.htm*		
<u>Bank of America Community Development Corporation</u>	-Large-scale projects. Projects large enough to promote tangible neighborhood change. -Community partnerships. By working with nonprofit community development corporations, community-based for-profit developers, and local public housing and re-development agencies, we can garner the support we need to complete projects that promote economic growth. -Local government support. We rely on strong political and financial support from local governments in the	Conducts real estate development and investment in low- and moderate-income communities across the nation. The BACDC focuses on projects in some of the most challenged areas and works with community-based entities to coordinate multilayered financing that make housing and commercial development projects possible. The BACDC both invests capital in community

All Excerpts From: *http://www.bankofamerica.com/community/* *index.cfm?template=cdb_commdevcorp2*	communities in which we work. -Multiple funding sources. We provide additional funding in the form of construction financing, credit enhancement, tax credit investments and homebuyer mortgages to complement our direct equity investments. -Catalytic. We look for projects that are “firsts” in their neighborhoods. These developments usually promise to be the catalyst for further investment and ongoing revitalization. Often these projects fit into a community's master plan for revitalization. -Focus on economic integration. Projects we fund must both attract market-rate housing to areas where it's lacking and preserve affordability for lower- or fixed-income residents. -Economically sustainable. In order to foster a successful, sustainable business, we choose projects that will prove profitable over the long term.	development projects and builds or rehabilitates properties.
Bank of America-	Developers of single-family subdivisions or multifamily rentals affordable to those	Stand-alone construction financing or one-stop shopping

Construction Financing *All Excerpts From:* *http://www.bankofamerica.com/community* */index.cfm?template=cdb_constructfin*	who earn 80% or less of the area median income.	for construction and permanent financing through a variety of term debt options.
HUD- Neighborhood Stabilization Program	NSP funds may be used for activities which include, but are not limited to: Establish financing mechanisms for purchase and re-development of foreclosed homes and residential properties; Purchase and rehabilitate homes and residential properties abandoned or foreclosed; Establish land banks for foreclosed homes; Demolish blighted structures; Re-develop demolished or vacant properties	As a component of the Community Development Block Grant (CDBG), NSP stabilizes communities that have suffered from foreclosures and abandonment. Purchases and re-develops foreclosed and abandoned homes and residential properties. NSP1, a term that references the NSP funds authorized under Division B, Title III of the Housing and Economic Recovery Act (HERA) of 2008, provides grants to all states and selected local governments on a formula basis. NSP2, a term that references the NSP funds authorized under the American Recovery and

All Excerpts From: *http://www.hud.gov/offices/cpd/community* *development/programs/neighborhoodspg/*		Reinvestment Act (the Recovery Act) of 2009, provides grants to states, local governments, nonprofits and a consortium of nonprofit entities on a competitive basis. The Recovery Act also authorized HUD to establish NSP-TA, a $50 million allocation made available to national and local technical assistance providers to support NSP grantees. NSP3, a term that references the NSP funds authorized under the Dodd–Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) of 2010, provides a third round of neighborhood stabilization grants

Appendix C:
Demographics & Ring Study Data Used:
Liliha, Honolulu, USA

Variables	[Liliha]	Honolulu, HI	ALL OF USA
Census Block Group			
% HHs w/ No Cash Rent, 2010	6.26%	11.21%	5.28%
% HHs w/ Rent $1,000-$1,249, 2010	39.96%	33.17%	24.03%
% HHs w/ Rent $1,250-$1,499, 2010	21.38%	13.88%	7.13%
% HHs w/ Rent $1,500-$1,999, 2010	11.77%	17.01%	7.07%
% HHs w/ Rent $2,000+, 2010	8.86%	9.29%	4.19%
% HHs w/ Rent $250-$499, 2010	1.86%	1.93%	6.19%
% HHs w/ Rent $500-$749, 2010	0.87%	2.04%	18.33%
% HHs w/ Rent $750-$999, 2010	7.87%	10.28%	24.67%
% HHs w/ Rent less than $250, 2010	1.18%	1.19%	3.11%
# Housing Units (HUs), 2010	3695	152,307	126,739,245
% Housing, Built 1999 or Later, 2010	6.04%	15.75%	26.35%
% Housing, Moved in 1969 or Earlier, 2010	11.56%	5.38%	3.27%
% Housing, Moved in 1970 to 1979, 2010	2.02%	1.92%	1.63%
% Housing, Moved in 1980 to 1989, 2010	1.27%	1.37%	1.26%
% Housing, Moved in 1990 to 1994, 2010	1.49%	1.20%	1.30%
% Housing, Moved in 1995 to 1998, 2010	2.25%	2.39%	2.33%
% Housing, Moved in 1999 or Later, 2010	81.41%	87.73%	90.21%
% Housing, Occ. Structure w/ 1 Unit Attached, 2010	6.07%	7.53%	5.63%
% Housing, Occ. Structure w/ 1 Unit Detached, 2010	53.66%	33.05%	61.86%
% Housing, Occ. Structure w/ 10-19 Units, 2010	7.26%	7.54%	4.51%
% Housing, Occ. Structure w/ 2 Units, 2010	2.92%	2.12%	3.51%

% Housing, Occ. Structure w/ 20-49 Units, 2010	5.17%	9.09%	3.00%
% Housing, Occ. Structure w/ 3-4 Units, 2010	5.12%	3.96%	4.27%
% Housing, Occ. Structure w/ 5-9 Units, 2010	6.24%	6.37%	4.78%
% Housing, Occ. Structure w/ 50+ Units, 2010	13.39%	30.15%	5.00%
# Housing, Occupied Units, 2010	3556	139,450	118,402,143
% Housing, Owner HHs, With No Mortgage, 2010	57.21%	37.85%	29.35%
% Housing, Owner Occupied, 2010	54.61%	47.46%	67.66%
% Housing, Renter Occupied, 2010	45.39%	52.54%	32.34%
# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | FIVE OR MORE, 2009	0	662	1,337,272
# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | FOUR, 2009	0	345	613,022
# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | NONE, 2009	5466	171,308	149,118,623
# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | ONE, 2009	2237	61,005	36,205,907

# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | THREE, 2009	161	2,274	2,173,353
# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | TWO, 2009	1687	38,043	26,678,306
% Pop, 0 to 5 Years, 2010	4.90%	6.55%	8.84%
% Pop, 12 to17 Years, 2010	5.07%	5.82%	8.65%
% Pop, 18 Years old and over, 2010	85%	82%	74%
% Pop, 18 to 24 Years, 2010	5.58%	8.11%	9.94%
% Pop, 25 to 34 Years, 2010	8.86%	12.92%	13.40%
% Pop, 35 to 44 Years, 2010	12.19%	14.07%	13.74%
% Pop, 45 to 54 Years, 2010	13.34%	14.50%	14.32%
% Pop, 55 to 64 Years, 2010	11.50%	12.09%	10.80%
% Pop, 6 to 11 Years, 2010	5.06%	6.05%	8.41%
% Pop, 65 Years and Older, 2010	33.51%	19.89%	11.90%
% Pop, 65 to 74 Years, 2010	11.20%	8.83%	6.11%
% Pop, 75 to 84 Years, 2010	13.53%	7.78%	4.04%
% Pop, 85 Years and Older, 2010	8.78%	3.28%	1.75%
# Population (Pop), 1990	11803	376,662	248,703,944
# Population (Pop), 2000	11734	371,657	281,421,906
# Population (Pop), 2000	11734	371,657	281,421,906
# Population (Pop), 2010	12454	396,795	309,494,843
# Population (Pop), 2015	n/a	340,181	322,382,723
# Vacant Units, 2010	139	12,857	8,337,102
Alcoholic beverages away from home (HH Avg $),	$173.20	$187.94	$215.63

2010			
Alcoholic beverages purchased on trips (HH Avg $), 2010	$36.90	$39.58	$44.91
Apparel and services (HH Avg $), 2010	$2,153.26	$2,110.81	$1,872.01
Available Renting Units (Mkt Segment), 2010	n/a	190	100
Employees, Total (by Place of Work), 2010	3649	263,057	119,050,433
Entertainment (HH Avg $), 2010	$3,228.97	$3,180.45	$3,005.31
Establishments, Total (by Place of Work), 2010	311	15,187	7,700,385
Female Median Age, 2010	n/a	44.4	36.9
Food (HH Avg $), 2010	$7,254.22	$7,118.04	$6,677.08
Food at home (HH Avg $), 2010	$4,000.00	$3,927.98	$3,803.21
Food away from home (HH Avg $), 2010	$3,262.15	$3,199.29	$2,880.29
HH, Average Size, 2010	n/a	2.42	2.54
HH, Median Vehicles, 2010	n/a	1.7	2.2
Housing (HH Avg $), 2010	$16,506.19	$16,117.40	$14,359.40
Housing, Median Rent ($), 2010	n/a	$1,218	$950
Housing, Median Value Owner HHs ($), 2010	n/a	$476,063	$177,046
Housing, Median Year Built, 2010	n/a	1970	1977
Housing, Median Year Moved In, 2010	n/a	2003	2003
Long Time Residents (Mkt Segment), 2010	n/a	135	100
Male Median Age, 2010	n/a	40.8	34.2
No Cars (Mkt Segment), 2010	n/a	196	100
Not in Labor Force (Mkt Segment), 2010	n/a	153	100
Population Density, 2010	n/a	3,773	87
Population Growth, 2010	n/a	-6	10
Public transportation (HH Avg $), 2010	$1,239.26	$1,097.76	$570.52
Subway or Bus to Work (Mkt Segment), 2010	n/a	196	100

Total Pop, Median Age, 2010	n/a	42.5	35.6
Total Retail Sales (including Food Services) ($000), 2010	n/a	6,987,850	4,253,550,572
Transportation (HH Avg $), 2010	$9,450.45	$9,264.85	$8,801.54
Unemployed (Mkt Segment), 2010	n/a	134	100

[99]

Variables	Within 1 mi	Within 3 mi	Within 5 mi	ALL OF USA
	Liliha Census Block Group 49001	Liliha Census Block Group 49001	Liliha Census Block Group 49001	
% HHs w/ No Cash Rent, 2010	5.21%	7.96%	11.86%	5.28%
% HHs w/ Rent $1,000-$1,249, 2010	37.01%	37.55%	34.46%	24.03%
% HHs w/ Rent $1,250-$1,499, 2010	14.16%	12.41%	14.14%	7.13%
% HHs w/ Rent $1,500-$1,999, 2010	12.42%	14.47%	15.72%	7.07%
% HHs w/ Rent $2,000+, 2010	6.39%	6.95%	7.70%	4.19%
% HHs w/ Rent $250-$499, 2010	4.02%	2.76%	2.00%	6.19%
% HHs w/ Rent $500-$749, 2010	4.46%	3.14%	2.10%	18.33%
% HHs w/ Rent $750-$999, 2010	13.60%	13.02%	10.77%	24.67%
% HHs w/ Rent less than $250, 2010	2.73%	1.75%	1.24%	3.11%
# Housing Units (HUs), 2010	27,920	80,112	134,091	126,739,245
% Housing, Built 1999 or Later, 2010	12.41%	17.90%	15.12%	26.35%
% Housing, Moved in 1969 or Earlier, 2010	6.77%	4.84%	5.09%	3.27%
% Housing, Moved in 1970 to 1979, 2010	1.98%	1.77%	1.76%	1.63%

[99] SimplyMap [New York, NY : Geographic Research, Inc.] Retrieved FEB 2011 from SimplyMap database. www.simplymap.com

% Housing, Moved in 1980 to 1989, 2010	1.42%	1.33%	1.35%	1.26%
% Housing, Moved in 1990 to 1994, 2010	1.42%	1.26%	1.21%	1.30%
% Housing, Moved in 1995 to 1998, 2010	2.40%	2.40%	2.49%	2.33%
% Housing, Moved in 1999 or Later, 2010	86.02%	88.39%	88.10%	90.21%
% Housing, Occ. Structure w/ 1 Unit Attached, 2010	7.96%	6.08%	7.44%	5.63%
% Housing, Occ. Structure w/ 1 Unit Detached, 2010	34.13%	24.73%	26.80%	61.86%
% Housing, Occ. Structure w/ 10-19 Units, 2010	7.44%	9.05%	8.63%	4.51%
% Housing, Occ. Structure w/ 2 Units, 2010	2.98%	2.40%	2.31%	3.51%
% Housing, Occ. Structure w/ 20-49 Units, 2010	8.80%	10.92%	10.34%	3.00%
% Housing, Occ. Structure w/ 3-4 Units, 2010	2.99%	4.10%	4.11%	4.27%
% Housing, Occ. Structure w/ 5-9 Units, 2010	4.83%	6.97%	7.15%	4.78%
% Housing, Occ. Structure w/ 50+ Units, 2010	30.61%	35.46%	33.02%	5.00%
# Housing, Occupied Units, 2010	26,674	74,086	122,017	118,402,143
% Housing, Owner HHs, With No Mortgage, 2010	45.32%	42.91%	40.06%	29.35%
% Housing, Owner Occupied, 2010	41.43%	40.83%	42.48%	67.66%
% Housing, Renter Occupied, 2010	58.57%	59.17%	57.52%	32.34%
# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | FIVE OR MORE, 2009	33	237	521	1,337,272
# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | FOUR,	109	144	271	613,022

2009				
# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | NONE, 2009	38,951	91,965	154,067	149,118,623
# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | ONE, 2009	14,589	32,703	55,479	36,205,907
# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | THREE, 2009	636	1,207	1,965	2,173,353
# LIFESTYLE (DEMOGRAPHICS) | DEMOGRAPHICS (PERSONAL INFORMATION) | # OF ADULTS IN HH 65 YEARS OR OLDER | TWO, 2009	8,011	19,066	32,635	26,678,306
% Pop, 0 to 5 Years, 2010	6.04%	6.28%	6.70%	8.84%
% Pop, 12 to17 Years, 2010	5.87%	5.41%	5.61%	8.65%
% Pop, 18 Years old and over, 2010	82%	83%	82%	74%
% Pop, 18 to 24 Years, 2010	7.00%	8.43%	8.68%	9.94%
% Pop, 25 to 34 Years, 2010	11.33%	13.00%	13.66%	13.40%
% Pop, 35 to 44 Years, 2010	13.32%	13.55%	14.19%	13.74%
% Pop, 45 to 54 Years, 2010	14.26%	14.02%	13.90%	14.32%
% Pop, 55 to 64 Years, 2010	12.39%	11.98%	11.55%	10.80%
% Pop, 6 to 11 Years, 2010	5.94%	5.66%	6.01%	8.41%
% Pop, 65 Years and Older, 2010	23.85%	21.67%	19.71%	11.90%
% Pop, 65 to 74 Years, 2010	9.98%	9.29%	8.67%	6.11%
% Pop, 75 to 84 Years, 2010	9.51%	8.52%	7.71%	4.04%

% Pop, 85 Years and Older, 2010	4.37%	3.86%	3.33%	1.75%
# Population (Pop), 1990	80,640	193,680	330,750	248,703,944
# Population (Pop), 2000	78,979	192,265	325,612	281,421,906
# Population (Pop), 2000	78,979	192,265	325,612	281,421,906
# Population (Pop), 2010	82,637	202,992	348,639	309,494,843
# Population (Pop), 2015	n/a	n/a	n/a	322,382,723
# Vacant Units, 2010	1,246	6,026	12,074	8,337,102
Alcoholic beverages away from home (HH Avg $), 2010	$172.05	$174.15	$179.51	$215.63
Alcoholic beverages purchased on trips (HH Avg $), 2010	$35.56	$35.41	$36.59	$44.91
Apparel and services (HH Avg $), 2010	$2,044.13	$2,009.72	$2,033.21	$1,872.01
Available Renting Units (Mkt Segment), 2010	n/a	n/a	n/a	100
Employees, Total (by Place of Work), 2010	75,678	208,278	257,073	119,050,433
Entertainment (HH Avg $), 2010	$3,040.55	$2,999.62	$3,048.71	$3,005.31
Establishments, Total (by Place of Work), 2010	4,486	11,206	14,370	7,700,385
Female Median Age, 2010	n/a	n/a	n/a	37
Food (HH Avg $), 2010	$6,926.80	$6,845.24	$6,921.42	$6,677.08
Food at home (HH Avg $), 2010	$3,853.40	$3,814.17	$3,849.92	$3,803.21
Food away from home (HH Avg $), 2010	$3,080.15	$3,035.44	$3,076.95	$2,880.29
HH, Average Size, 2010	n/a	n/a	n/a	3
HH, Median Vehicles, 2010	n/a	n/a	n/a	2
Housing (HH Avg $), 2010	$15,690.38	$15,458.63	$15,598.11	$14,359.40
Housing, Median Rent ($), 2010	n/a	n/a	n/a	$950
Housing, Median Value Owner HHs ($), 2010	n/a	n/a	n/a	$177,046
Housing, Median Year Built, 2010	n/a	n/a	n/a	1977
Housing, Median Year Moved In, 2010	n/a	n/a	n/a	2003
Long Time Residents (Mkt Segment), 2010	n/a	n/a	n/a	100
Male Median Age, 2010	n/a	n/a	n/a	34
No Cars (Mkt Segment), 2010	n/a	n/a	n/a	100

Not in Labor Force (Mkt Segment), 2010	n/a	n/a	n/a	100
Population Density, 2010	n/a	n/a	n/a	87
Population Growth, 2010	n/a	n/a	n/a	10
Public transportation (HH Avg $), 2010	$1,100.66	$1,042.01	$1,033.55	$570.52
Subway or Bus to Work (Mkt Segment), 2010	n/a	n/a	n/a	100
Total Pop, Median Age, 2010	n/a	n/a	n/a	36
Total Retail Sales (including Food Services) ($000), 2010	n/a	n/a	n/a	4,253,550,572
Transportation (HH Avg $), 2010	$8,936.30	$8,847.51	$8,978.57	$8,801.54
Unemployed (Mkt Segment), 2010	n/a	n/a	n/a	100

100

[100] SimplyMap [New York, NY : Geographic Research, Inc.] Retrieved FEB 2011 from SimplyMap database. www.simplymap.com

Appendix D:
Existing Local Business Data: Liliha

NAME	TYPE	DESCRIPTION	MIN SQAURE FOOTAGE	MAX SQUARE FOOTAGE	LOCAL SALES VOLUME	MIN LOCATION EMPLOYEES	MAX LOCATION EMPLOYEES	RENT & LEASING (Business Expendedures Tab)	EST. SQ. FT.	EST. EMPLOYEES
Radiology Group	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
A W Dental Group Inc	Office	Medical	0	2,499	$435,000	3	3	$25,000-$50,000	1249.5	3
Bellezzo, Joseph M MD	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Berman, Steven J MD	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Blaisdell, Richard K MD	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Bone Marrow Hawaii Donor	Office	Medical	2,500	9,999	$580,000	4	4	$10,000-$25,000	6249.5	4
Bornemann, Michael MD	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Cancer Center of Hawaii	Office	Medical	2,500	9,999	$1,990,000	10	10	$100,000-$250,000	6249.5	10
Digao, Ana Marie MD	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Ernnie Yim Inc	Office	Medical	0	2,499	$995,000	5	5	$50,000-$100,000	1249.5	5
Gamma Knife Ctr of The Pacific	Office	Medical	0	2,499	$1,220,000	4	4	$25,000-$50,000	1249.5	4
Ganel, Jose MD	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Glenn M Pang Inc	Office	Medical	0	2,499	$597,000	3	3	$25,000-$50,000	1249.5	3
Hawaii Endoscopy Ctr	Office	Medical	10,000	39,999	$3,800,000	25	25	$100,000-$250,000	24999.5	25
Hawaii Hematology Oncology	Office	Medical	2,500	9,999	$1,990,000	10	10	$100,000-$250,000	6249.5	10
Island Imaging Ctr	Office	Medical	2,500	9,999	$1,506,000	5	9		6249.5	7
Jared G Sugihara Inc	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Jim, Robert T S MD	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Kaufman, Larry J MD	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Kenneth Cy Kwock	Office	Consultant	2,500	9,999	$184,000	1	1	Less than $10,000	6249.5	1
Liberty Dialysis-HAWAII LLC	Office	Medical	40,000	100,000	$91,500,000	300	300	Over $500,000	70000	300

Medical Diagnostic Ctr	Office	Medical	2,500	9,999	$1,757,000	7	7		6249.5	7
Mickey MY Tseng Inc	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Miyamoto, Robin E	Office	Medical	0	2,499	$363,000	1	4		1249.5	2.5
Morita, Lisa Ann L	Office	Medical	2,500	9,999					6249.5	0
Oahu Imaging LLC	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Oncare	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Oncology Management Systems	Office	Medical	0	2,499	$597,000	3	3	$25,000-$50,000	1249.5	3
Pacific Radiation Oncology Inc	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Pharmacare Hawaii	Retail	Pharmacy	10,000	39,999	$1,830,000	10	19	$50,000-$100,000	24999.5	14.5
Rarama, Michelle A	Office	Health	2,500	9,999					6249.5	0
Sisters Of St Francis	Other	Religious	10,000	39,999		4	4		24999.5	4
Smith, Stephen M	Office	Medical Research	2,500	9,999					6249.5	0
St Francis Healthcare Syst	Office	Medical	2,500	9,999	$580,000	1	4	$10,000-$25,000	6249.5	2.5
St Francis Healthcare System	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Sullivan Dialysis	Office	Medical Clinic	2,500	9,999	$2,745,000	9	9	$50,000-$100,000	6249.5	9
Surgical Associates	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Thomas Ka Shun Tan Inc	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Thomas KL Lau Inc	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Ueunten, Aileen A	Office	Medical	2,500	9,999					6249.5	0
Wong, Arthur K MD	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Wong, Carlson B MD	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Yee, Edwin J H MD	Office	Medical	0	2,499	$597,000	1	4		1249.5	2.5
Avior Engineering	Other	Computer Svs	2,500	9,999	$157,000	1	1	Less than $10,000	6249.5	1
Hawaii Stone Care	Other	Tile Contractor & Svs	2,500	9,999	$152,000	1	1	Less than $10,000	6249.5	1
Honolulu Fire Station #25	Other	Fire Station	10,000	39,999		5	5		24999.5	5
Honolulu First Church-Nazarene	Other	Religious	10,000	39,999		3	3		24999.5	3
Honolulu Mailing Svc	Other	Computer Svs	2,500	9,999	$314,000	2	2	$10,000-$25,000	6249.5	2
John Sable Decorator	Other	Painter	0	2,499	$222,000	1	4	Less than $10,000	1249.5	2.5

Judd Waolani Nazarene School	Other	School	40,000	100,000		27	27		70000	27
Julian Construction	Other	Construction	2,500	9,999	$528,000	1	1	Less than $10,000	6249.5	1
Kama'Aiana Kids	Other	Child Care Svc	2,500	9,999	$672,000	16	16	$25,000-$50,000	6249.5	16
Kikunobu Dance Co Inc	Other	Dance Instructor	2,500	9,999	$645,000	15	15		6249.5	15
Maemae School	Other	School	40,000	100,000		80	80		70000	80
Pumehana Associates	Office	Business Svc	2,500	9,999	$49,000	1	1	Less than $10,000	6249.5	1
Sable, John	Other	Interior Decorator	2,500	9,999	$188,000	1	4		6249.5	2.5
Votec Sails	Retail	Sports Goods	0	2,499	$148,000	1	1	$10,000-$25,000	1249.5	1

TOTAL EMPLOYEES	TOTAL SQ. FT.	TOTAL SQ. FT. OFFICE	TOTAL SQ. FT. RETAIL	TOTAL SQ. FT. OTHER
625	**496223**	209979.5	26249	266244

Appendix E:
Architectural Guidelines

Supplemental Research for Part III: Architectural Guidelines

The following architectural guidelines are the result of research efforts to create form based codes for re-development efforts described in this document. The codes were developed according to third party research applicable to the topic. Many of the codes were created with the idea that consumer preferences needed to play a role in developing standards. Unfortunately, the data gathered from consumers did not manifest itself as many guidelines as anticipated. As a result, codes became based on other types of research that may have been used to develop existing architectural guidelines. Many of the codes began to resemble existing architectural guidelines and an issue of re-inventing the wheel became apparent. Some guidelines are unique to this project and are still encouraged to be used in re-development situations. Others are stored in this appendix should the need for additional architectural guidelines arise.

The guidelines of re-development are broken into four subcategories as follows:

R = Residential

C = Commercial

M = Mixed Use

CN = Circulation

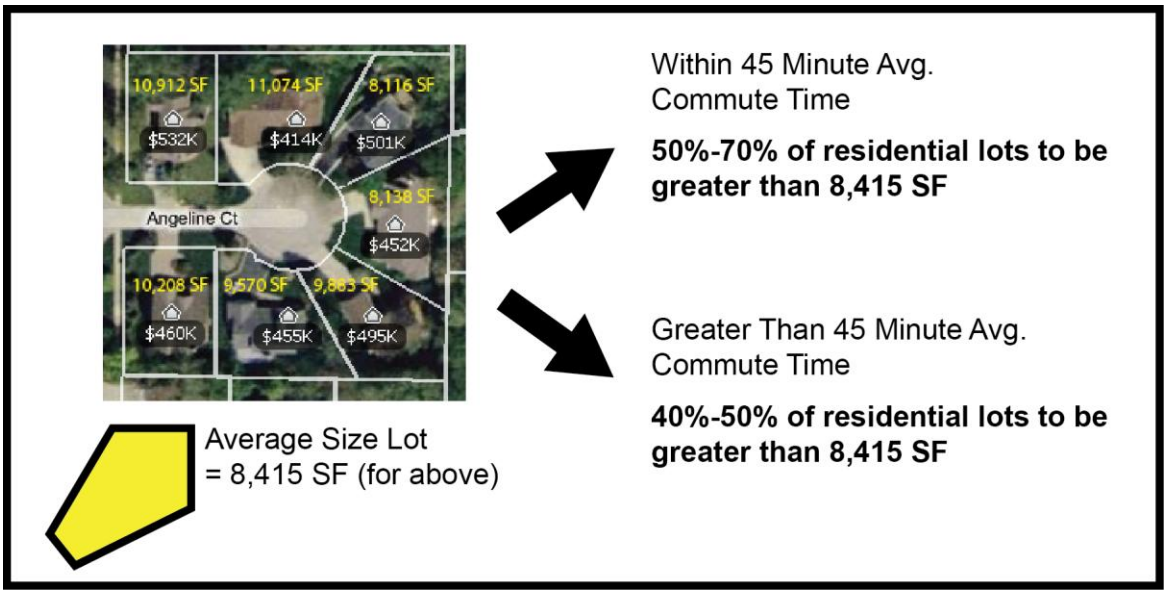
P = Public Spaces

Residential Architectural Guidelines

The term “residential” refers to areas within boundaries of determined re-development area that meet the following criteria. Residential architectural guidelines pertain to all existing structures and land property of sites used solely for residential purposes. Existing residential areas are zoned for residential use.

Proposed residential areas refer to any area, structure, or part of structure that is to be developed solely for residential purposes. Residential developments can be mixed with other types of developments on the same site.

R1) Large Lot Homes - The total footprint of the area of residential development shall be 40%-70% dedicated to single family homes on large lots. “Large lot” homes refer to surpassing average lot sizes within a proposed development area. Areas of development with an existing average commute time to work of 45 minutes or more must be between 40%-50% for large lot homes. Commute times lower than 45 minutes must be between 50%-70%.

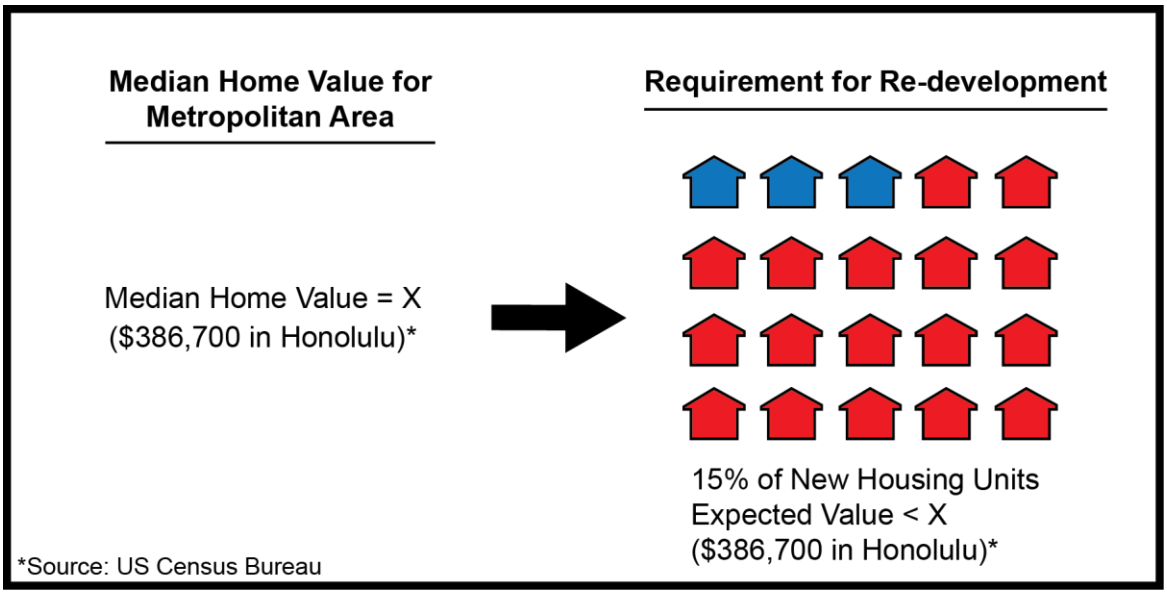


According to consumer preference surveys, one of the most valued assets of suburbia is its ability to offer large plots of land to homebuyers. In most cases, cities cannot offer highly desirable plots of land while suburbia can. Due to existing demand, large lot homes must play an integral part in re-development. Because up to 70% of the general population would prefer to live in a large lot home and rely on automobiles than a community consisting of small lot homes that is walkable[101], the ratio must be reflected in suburban communities. However,

[101] Belden Russonello & Stewart, "2004 National Community Preference Survey" (survey conducted for Smart Growth America and National Association of Realtors August 26, 2004 - September 6, 2004) www.smartgrowthamerica.org/documents/NAR-SGASurvey.pdf pg2

when commute times reach 45 minutes, the preference of population is split between large lot communities and communities with shorter commute times[102]. As commute times grow, the trend of support for large lot communities falls. The percentage amount of large lot homes suggested in a development region correlate to average commute times to work.

R2) Housing for Moderate and Low Incomes – 15% of all additional housing units developed are to be built for moderate to low income families. This is determined by developing dwelling units that are estimated to be valued at or below the median home value for the associated metropolitan area.



Organizations advocating walkable communities such as The Congress for the New Urbanism have claimed that it is important to integrate affordable housing into neighborhoods. This can create two positive effects: the diversity of communities can be increased and it helps avoid forcing concentrations of poor families to form. According to recent surveys, people agree that housing for moderate to low income families should be addressed by their local governing bodies. 89% of people were found to believe that having housing for people with

[102] Belden Russonello & Stewart, "2004 National Community Preference Survey" (survey conducted for Smart Growth America and National Association of Realtors August 26, 2004 - September 6, 2004) www.smartgrowthamerica.org/documents/NAR-SGASurvey.pdf pg3

moderate and low incomes was a very high to middle priority for their state to address[103]. In a separate study, roughly two-thirds of the polled population believed that new housing developments in their state should be required to include at least 15% of housing for moderate to low income families[104].

R3) Residential Parking

Parking and garages should not take prominence over pedestrian use and should avoid facing streets. Possible pedestrian destinations should stand between parking and sidewalks or take prominence over parking.

In order to make areas more pedestrian friendly, pedestrian activity must be considered in residential housing. If convenience controls whether residents will choose to walk or drive to a location, vehicular based arrangements can encourage automobile use. Also, areas where pedestrians are likely to be

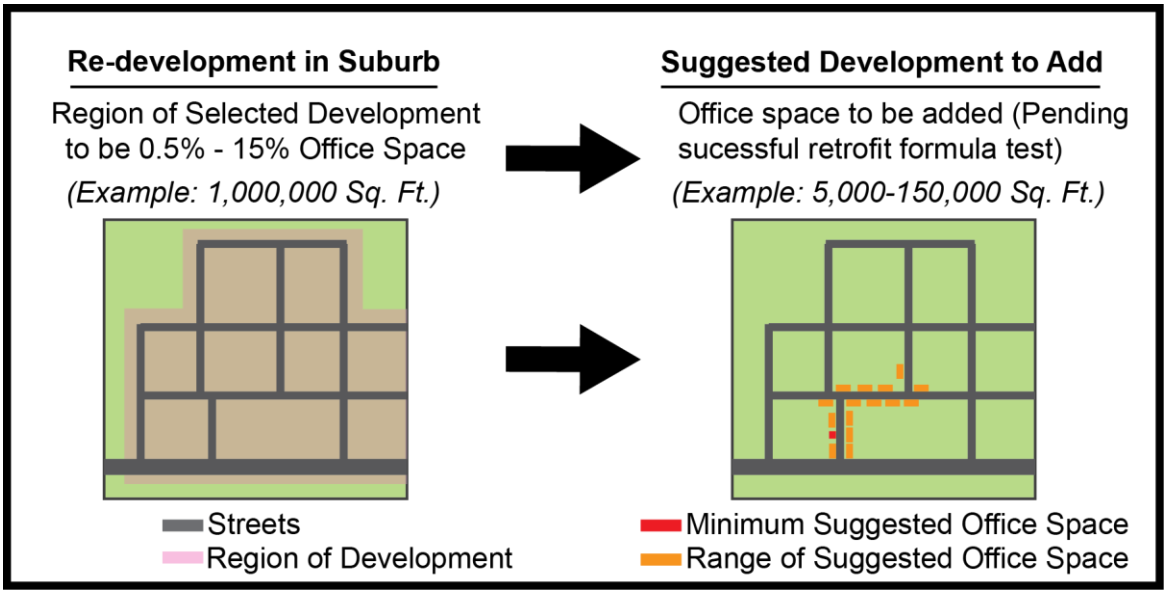
[103] Belden Russonello & Stewart, "2004 National Community Preference Survey" (survey conducted for Smart Growth America and National Association of Realtors August 26, 2004 - September 6, 2004) www.smartgrowthamerica.org/documents/NAR-SGASurvey.pdf pg1
[104] Belden Russonello & Stewart, "National Survey on Growth and Land Development" (survey conducted for Smart Growth America Spetember 7, 2000 - September 10, 2000) http://www.smartgrowthamerica.org/poll.pdf pg2

present can help promote walkable communities. The above diagram shows a contrast of pedestrian considerations in residential settings.

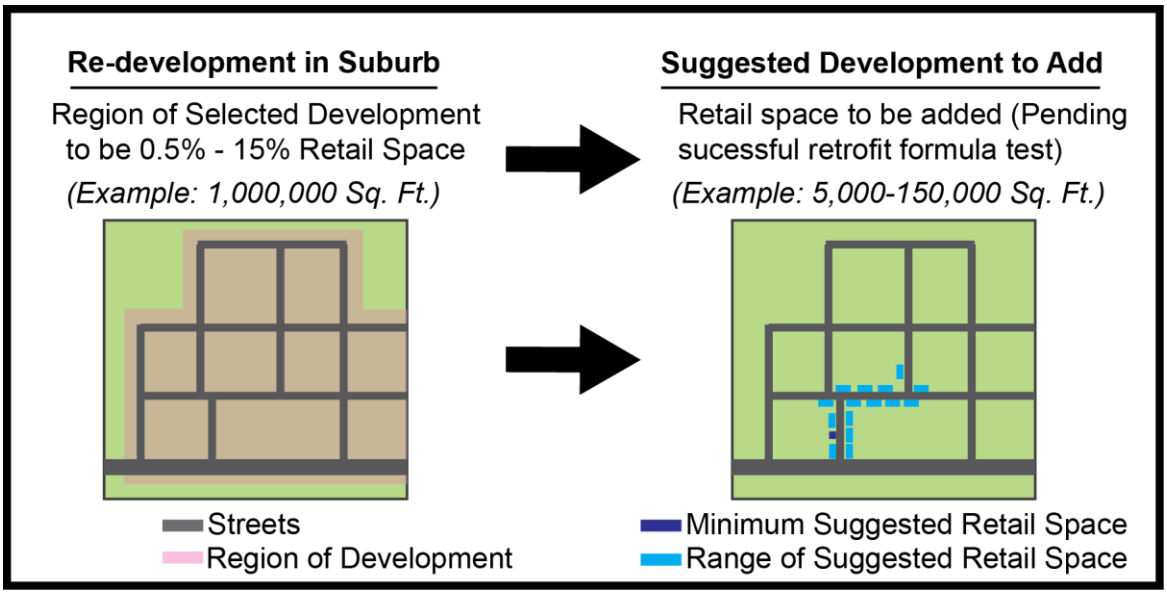
Commercial Architectural Guidelines

The term “commercial” refers to any area within boundaries of determined re-development area that meets the following criteria. Commercial architectural guidelines pertain to all existing structures and land property of sites used solely for commercial purposes. Existing sites are commercially zoned. Proposed commercial developments refer to any area, structure, or part of structure that is to be developed solely for commercial purposes. Commercial developments can be mixed with other types of development on the same site.

C1) Office Space Requirements



C2) Retail Space Requirements



Mixed Use Architectural Guidelines

The term “Mixed use” refers to any area within boundaries of determined re-development area that meets the following criteria. Mixed use spaces refer to any combination of residential, commercial, public or civic spaces on a single site.

M1- Mixed Used Zoning

Mixed use zoning should be permitted in order to place a variety of building types in close proximity to each other. With the allowance of mixed use zoning in communities, developments such as live/work units are encouraged. Re-zoning can be a lengthy and difficult process that cannot always be achieved as described in part 2.

M2- Live/Work Spaces

Live/work spaces are encouraged in scenarios where commercial and residential space must be added to a community. The general increase of

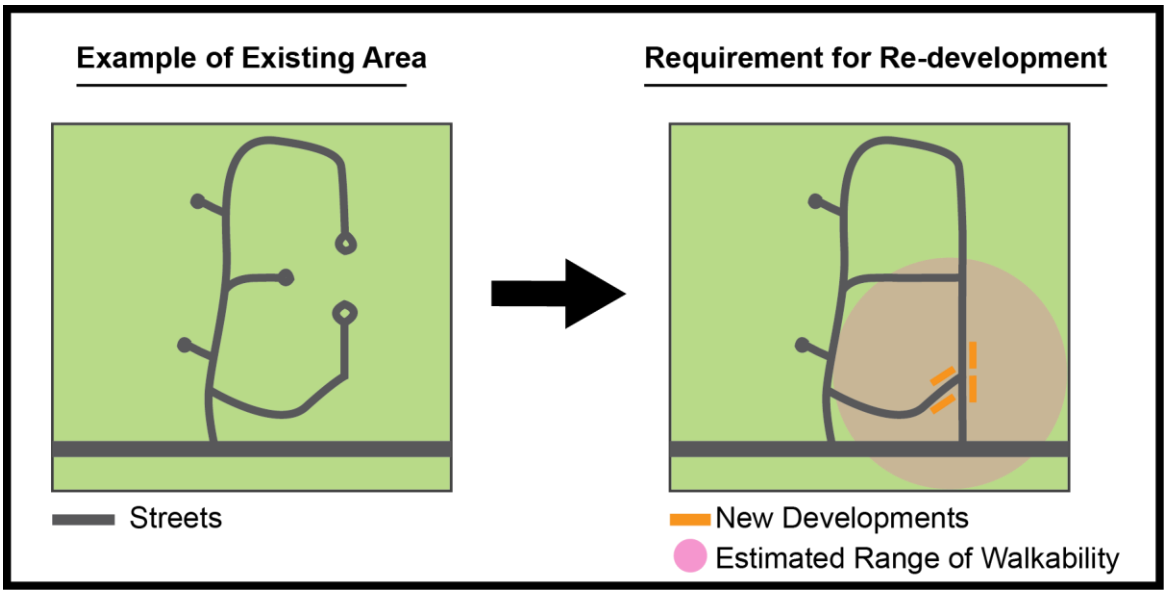
commercial spaces should relate to the increase in residential unites relative to existing conditions. The Retrofit Formula can be used to help determine appropriate sizing for commercial developments in existing neighborhoods.

Circulation Architectural Guidelines

The term “circulation” refers to any public area used as a medium to travel. Circulation refers to but is not limited to public walkways, roadways, bicycle paths, mass transit lines, etc.

CN1 – Culs-De- Sac

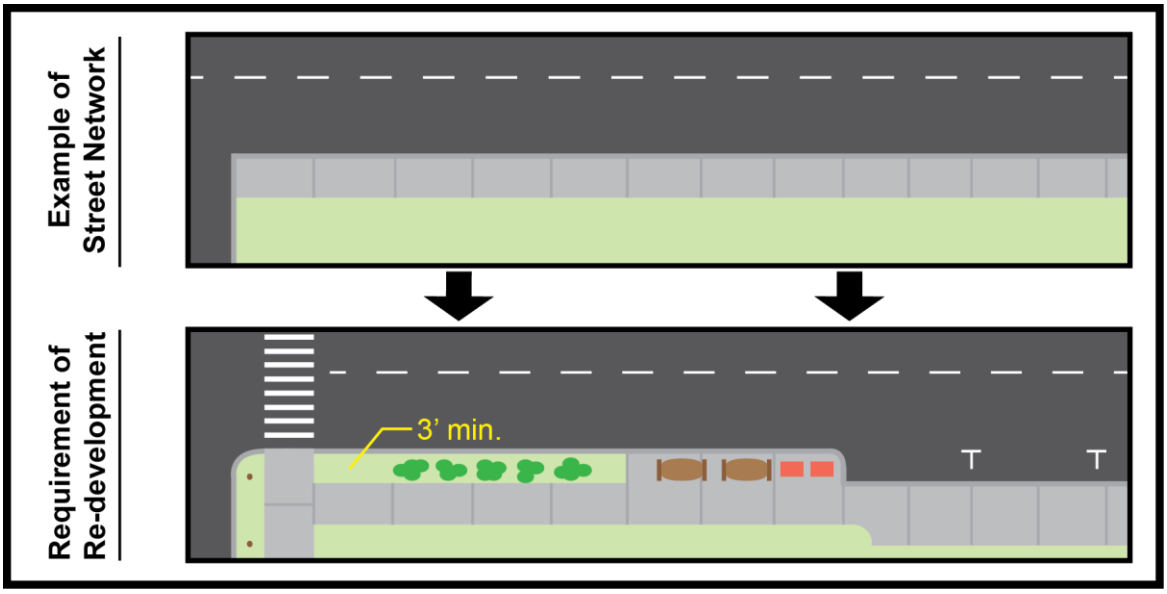
Culs-de-sac shall not be permitted within 1,500 feet of new development unless connection to a street network is not possible. Culs-de-sac must be converted into street through way where possible. Developing street networks for culs-de- sac that are not affected under this rule are encouraged.



The EPA’s Smart Growth program recognizes 1,500 feet as a generalized limit people are willing to walk in a comfortable environment. In order for the community being re-developed to achieve maximum walkability, streets must be oriented in a convenient manner to encourage pedestrian traffic.

CN2 – Sidewalks

Sidewalks are required to accompany roadways within 1,500 feet of new developments. Sidewalks are encouraged for the entire region of re-development. New sidewalks should be set back from lanes supporting through traffic minimum of 3 ft.



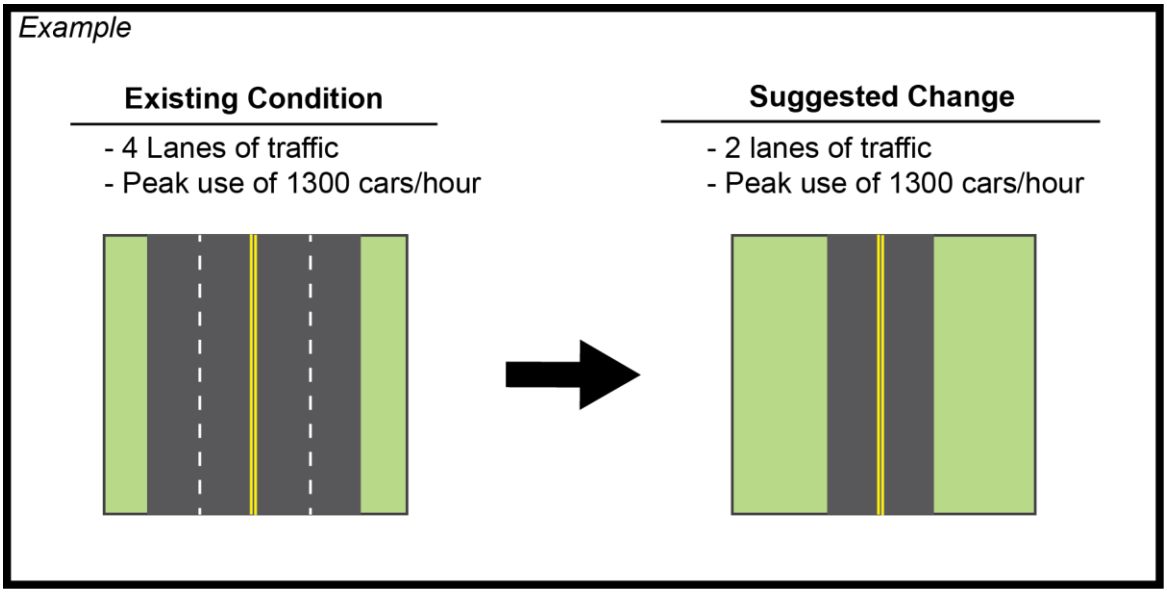
Creating mediums for pedestrian circulation is crucial to encourage walkable neighborhoods. According to public surveys, over a third of households believe that their neighborhood does not have enough sidewalks[105]. Another study finds that over 75% of people would agree to use part of the state transportation budget to create more sidewalks and stop signs in communities even if it means less money to build new highways[106]. Sidewalks should be present when within reasonable walking distance of new developments. Setting back sidewalks from lanes of traffic not only creates a safety buffer for pedestrians, but also it allows space for greenery, utility posts, benches,

[105] Belden Russonello & Stewart, "2004 National Community Preference Survey" (survey conducted for Smart Growth America and National Association of Realtors August 26, 2004 - September 6, 2004) www.smartgrowthamerica.org/documents/NAR-SGASurvey.pdf pg2
[106] Belden Russonello & Stewart, "National Survey on Growth and Land Development" (survey conducted for Smart Growth America Spetember 7, 2000 - September 10, 2000) http://www.smartgrowthamerica.org/poll.pdf pg2

newspaper vending, etc. Setting back sidewalks is less crucial when street side parking is available. Wide sidewalks beyond 4 ft. in width are encouraged when no buffer is present.

CN3 – Street Width

One lane of travel is needed for every 700 vehicles that travel on a given street in an hour. Street widths should be limited to 4 lanes when within a public walking environment such as an urban core.

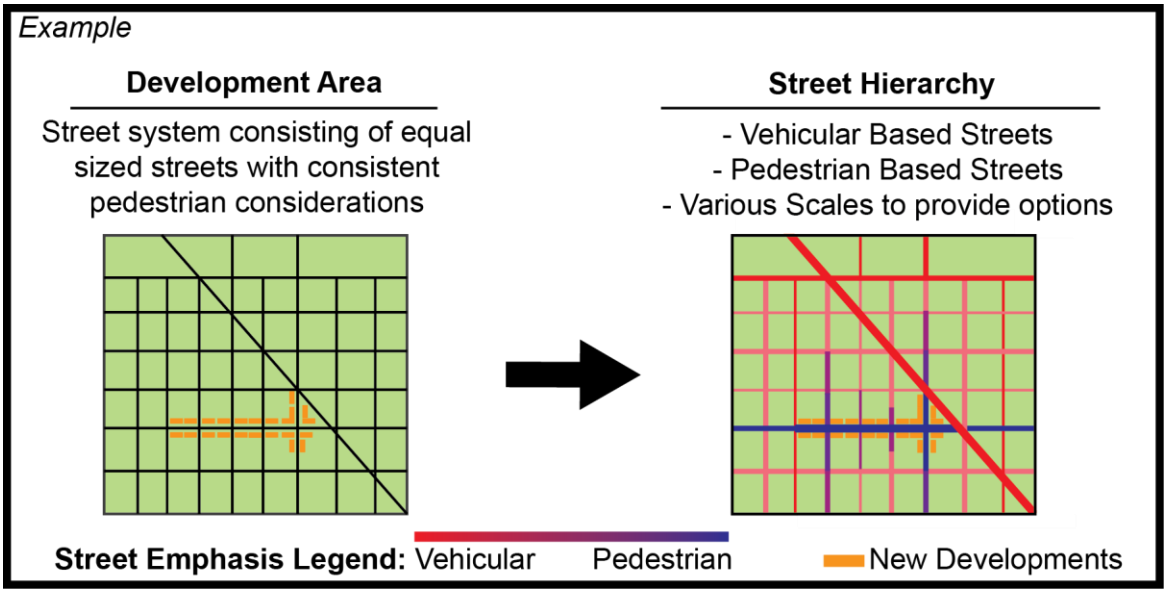


A lane of traffic typically has the capacity to handle 700 cars per hour without becoming jammed[107].Sizing of streets should be planned accordingly. Oversized streets can be downsized if they do not carry the amount of lanes multiplied by 700. It may be appropriate to expand street size, or create alternate routes when traffic exceeds the capacity of a street. Keeping the amount of lanes to a minimum will help encourage pedestrian safety and activity.

[107] Andres Duany, Jeff Speck, and Mike Lydon, “The Smart Growth Manual” McGraw Hill, 2010. 8.6

CN4 – Street Hierarchy

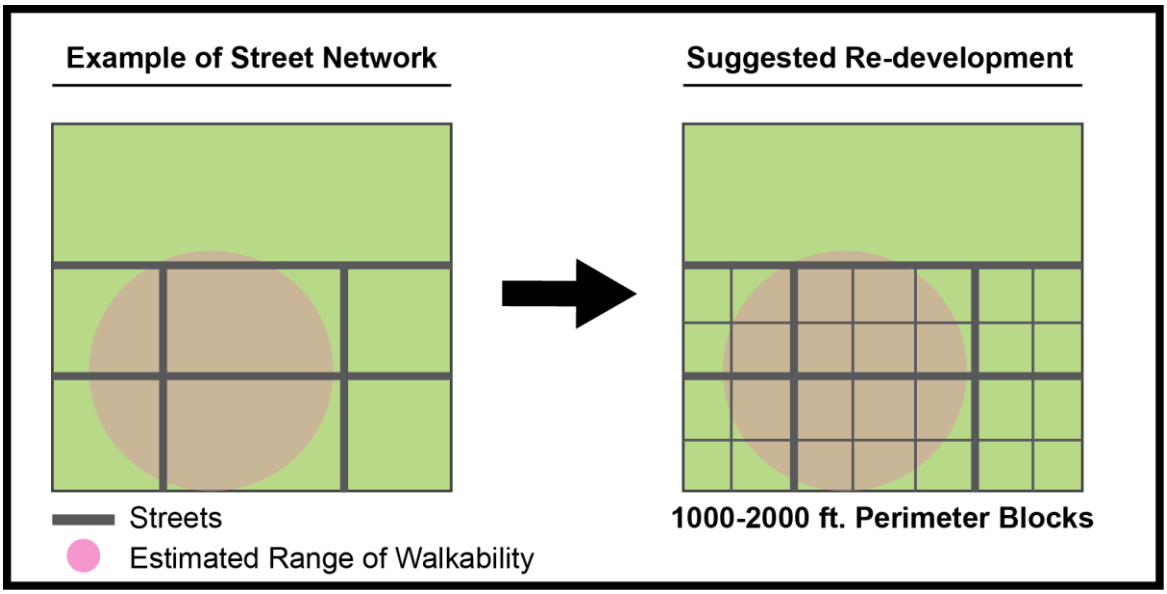
Streets must be designated as having their primary focus be either for vehicular or pedestrian travel. The capacity must also be determined for each street to develop suggested routes of travel. Increasing emphasis should be made on pedestrian circulation as areas are closer to the walkable core of the development.



With prominence placed on certain street networks, they often have the ability to become destinations within the community, or valuable travel corridors. It is important to put emphasis on pedestrians in areas where walking is encouraged the most. Some streets should be tailored more for vehicular circulation to avoid congestion in the area.

CN5 – Block Size

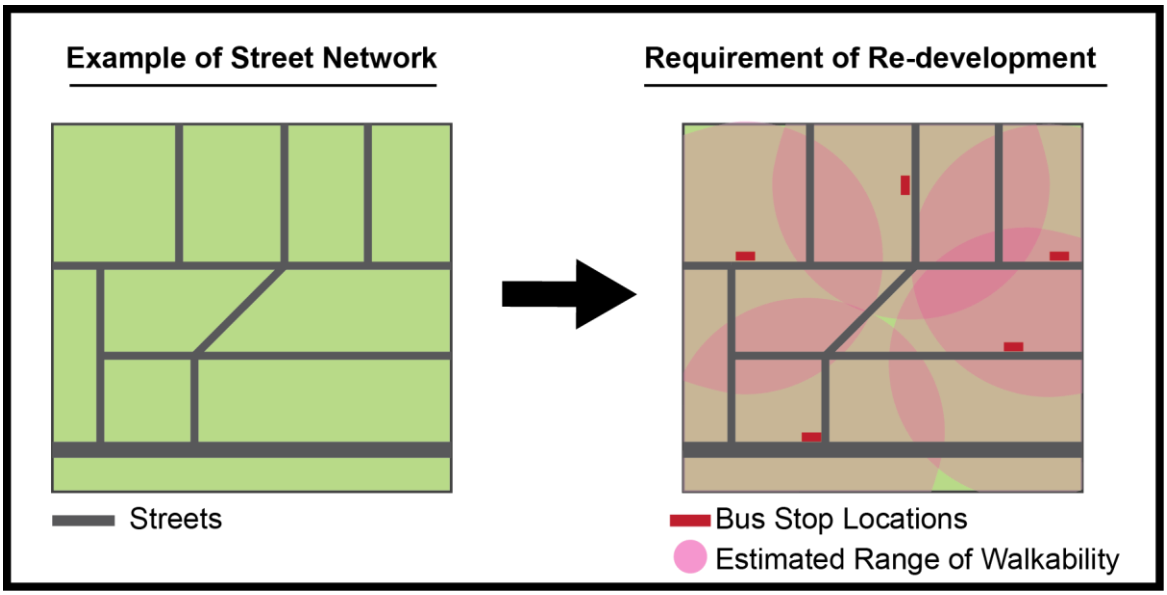
Perimeter of blocks is to be 1000-2000 ft. to promote walkability.



With smaller block sizes, pedestrians and vehicles have more routes of travel. Multiple streets will reduce vehicular congestion and make streets safer for pedestrians. Pedestrians will have a greater number of destinations; they will likely travel to places within their estimated 1,500 ft., which is the maximum casual walking distance. This is diagramed in CN6 to show the amount of paths of travel possible with in a 2,000 ft. perimeter block pattern.

CN6 – Bus Stops

Bus stops must be placed less than 1,500 feet from all properties within re-development area where transit authorities permit.



By placing bus stops within comfortable walking distance, pedestrians can travel to greater regions conveniently. Bus traffic can increase visitors to development areas and reduce traffic congestion. Around half of polled individuals expressed that there was too little public transportation within walking distance of where they live[108].

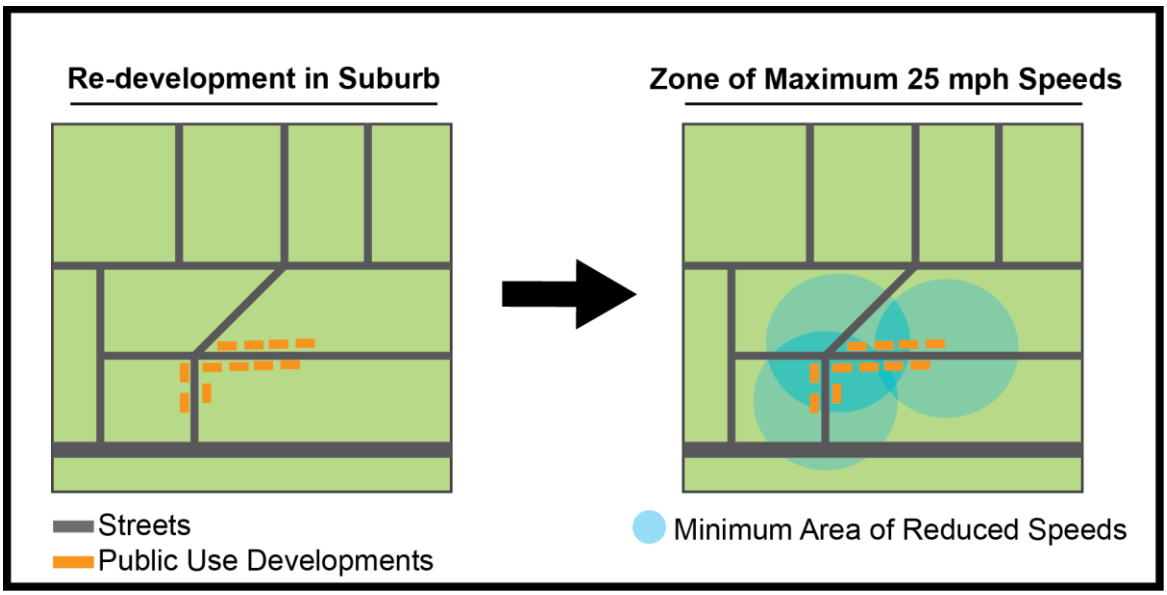
CN7 – Mass Transit Stops

Re-development is encouraged to tie into existing mass transit systems where possible. If an area is not able to tie directly into mass transit lines, measures should be taken to provide access to mass transit for the community. This can be achieved by arranging paths of travel toward existing mass transit stops or providing shuttle services to nearby stations.

[108] Belden Russonello & Stewart, "2004 National Community Preference Survey" (survey conducted for Smart Growth America and National Association of Realtors August 26, 2004 - September 6, 2004) www.smartgrowthamerica.org/documents/NAR-SGASurvey.pdf pg2

CN8 – Speed Limits

In areas of development, speed limits should be no more than 20-25 mph in pedestrian friendly areas. Pedestrian friendly areas should be within 1,500 feet of areas of public interest.



In order for places to encourage walkability, measures must be made to ensure that pedestrians to feel safe in the environment. Research shows that pedestrians have a 95% chance of surviving a collision with a car travelling 20 mph[109]. If an area is placing prominence of pedestrian activity, speed limits should be reduced to protect their safety and provide a comfortable environment for travel.

Public Spaces Architectural Guidelines

The term “public spaces” applies to all areas that are open to the general public. Examples of public spaces include but are not limited to parks, malls, rest stops, libraries, schools, etc.

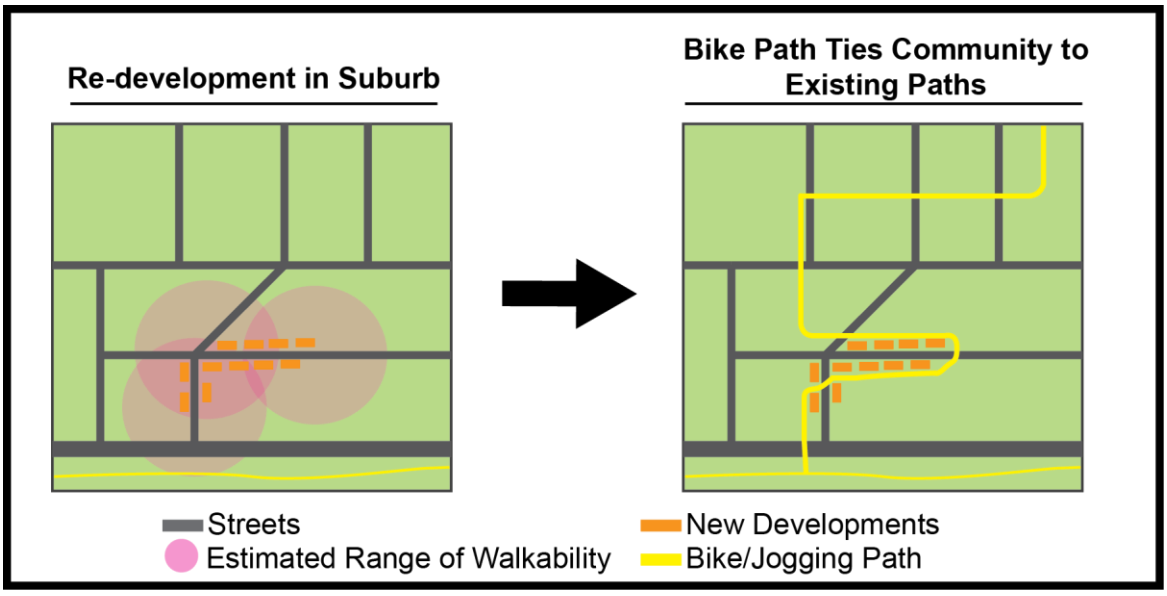
[109] Andres Duany, Jeff Speck, and Mike Lydon, “The Smart Growth Manual” McGraw Hill, 2010. 8.2

P1- *Park Spaces*

Public park spaces are to remain or be introduced in re-developments. Parks should be a point of interest in planning and serve as a viable destination pedestrians in the community. Providing bike and walking paths to promote park use is encouraged.

P2- Bike Paths

Existing bicycle/jogging paths are to extend to areas of re-development where such path exists within the vicinity of the region to be developed. New bicycle/jogging paths are encouraged to be built when area within 1,500 square feet of new development surpasses 1/3 of the total land area of selected development region. Bicycle/Jogging paths are not to be integrated with streets.



Over 40% of Americans are estimated to believe that there is a lack of places to walk or exercise for fun and places to bike in their community[110]. These public amenities should be accessible within reasonable walking distance to

[110] Belden Russonello & Stewart, "2004 National Community Preference Survey" (survey conducted for Smart Growth America and National Association of Realtors August 26, 2004 - September 6, 2004) www.smartgrowthamerica.org/documents/NAR-SGASurvey.pdf pg2

encourage use and well-being in the community. When possible, paths should tie into a greater network of trails and paths, and be incorporated into plans where a substantial portion of the selected region is being re-developed. Paths are not to be integrated with streets for the safety of users.

j) Bibliography

Agnese, Joseph. *Industry Surveys: Supermarkets & Drugstores.* New York, NY: Standard & Poor's, 2010.

Bartling, Hugh. *Suburban Sprawl: Culture, Theory, and Politics.* Lanham: Rowman & Littlefield Publishers, Inc., 2003.

Belden Russonello & Stewart. "*2004 National Community Preference Survey Conducted for Smart Growth America and National Association of Realtors.*" Belden Russonello & Stewart: Research and Communications 1 (2004): n. pag. Smart Growth America. Web. 11 May 2010.

Belden Russonello & Stewart. "*National Survey on Growth and Land Development September 2000 for Smart Growth America.*" Belden Russonello & Stewart: Research and Communications 1 (2000): n. pag. Smart Growth America. Web. 11 May 2010.

Belden Russonello & Stewart, and National Association of Realtors. "*2007 Growth and Transportation Survey: Interview Schedule*." National Association of Realtors and Smart Growth America 1 (2007): n. pag. Smart Growth America. Web. 11 May 2010.

Bogart, William T. *Don't Call It Sprawl: Metropolitan Structure in the 21st Century.* New York: Cambridge University Press, 2006.

Brown, Linda, and David Walters. *Design First: Design-based Planning for Communities*. London: Architectural Press, 2004.

Bruegmann, Robert. *Sprawl: A Compact History.* Chicago: University Of Chicago Press, 2006.

Davis, Dewberry &. *Land Development Handbook*. New York: McGraw-Hill

Professional, 2008.

Duany, Andres, Elizabeth Plater-Zyberk, and Jeff Speck. *Suburban Nation: The Rise of Sprawl and the Decline of the American Dream*. New York: North Point Press, 2001.

Duany, Andres, Jeff Speck, and Mike Lydon. *The Smart Growth Manual* . New York: McGraw-Hill, 2010. Print.

Duany Plater-Zyberk & Co. "*SmartCode Module V9.2*" 2008

Duany Plater-Zyberk & Co. "*Sprawl Repair SmartCode Module V9.2*" 2008

Emerson, Chad. *The SmartCode Solution to Sprawl*. Washington: Environmental Law Institute, 2007.

Energy Information Administration. "*U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*" 2007

Flint, Anthony. *This Land: The Battle over Sprawl and the Future of America.* John Hopkins University Press, 2006.

Friedman, Avi. *Sustainable Residential Development*. New York: McGraw-Hill Professional, 2007.

Geographic Research, Inc. *SimplyMap*. Geographic Research, Inc. Accessed Web. 10 Feb. 2011. <http://www.simplymap.com>

Goodridge, Steven G. "*The Segway Is a Vehicle: Implications for Operation and Regulation of the EPAMD in Traffic*" North Carolina Coalition for Bicycle Driving 2003

Girling, Cynthia, and Ronald Kellett. *Skinny Streets and Green Neighborhoods: Design for Environment and Community.* Washington, DC: Island Press, 2005.

Hall, Kenneth B., and Gerald A. Porterfield. *Community by Design: New Urbanism for Suburbs and Small Communities*. New York: McGraw-Hill Professional, 2001.

Health Trends*. Health Trends in Hawaii*. N.p., n.d. Web. 5 Feb. 2011. <http://www.healthtrends.org/demo_pop_growth.aspx>.

Kidder, Tracy. *Home Town.* New York: Washington Square Press, 2000.

Kunstler, James Howard. *Home from Nowhere: Remaking Our Everyday World for the 21st Century*. New York: Touchstone Press, 1998.

Marshall, Alex. How Cities Work : *Suburbs, Sprawl, and the Roads Not Taken.* Austin: University of Texas Press, 2001.

Minerbi, Luciano, Peter Nakamura, Kiyoko Nitz, and Jane Yanai. *Land Readjustment: The Japanese System; A Reconnaissance and a Digest*. Boston, Mass.: Published by Oelgeschlager, Gunn & Hain, in association with the Lincoln Institute of Land Policy, 1986. Print.

Moe, Richard, and Carter Wilkie. *Changing Places: Rebuilding Community in the Age of Sprawl.* New York: Henry Holt & Company, 1997.

Nelson, Arthur C., Liza K. Bowles, Julian C. Juergensmeyer, and James C. Nicholas. *A Guide to Impact Fees and Housing Affordability* . Washington, DC: Island Press, 2008. Print.

Nozzi, Dom. Road to Ruin: *An Introduction to Sprawl and How to Cure It.*

Westport, CT: Praeger Publishers, 2003.

Parolek, Daniel G., Karen Parolek, and Paul C. Crawford. *Form-Based Codes: A Guide of Planners, Urban Designers, Municipalities, and Developers*. Hoboken, NJ: John Wiley & Sons, 2008.

Peiser, Richard. *Regenerating Older Suburbs.* Washington, DC: Urban Land Institute, 2007. Print.

Redmond, Lothlorien S. & Patricia L. Mokhtarian. "*The Positive Utility of the Commute: Modeling Ideal Commute Time and Relative Desired Commute Amount*" Transportation 28: 179–205, 2001

ReferenceUSA, *US Businesses Database*. 2010 Infogroup, Inc.

Soule, David C. & Neal Price. *Remaking American Communities: A Reference Guide to Urban Sprawl (Our Sustainable Future).* Lincoln and London: University of Nebraska Press, 2007.

Soule, David C. *Urban Sprawl: A Comprehensive Reference Guide*. New York: Greenwood Press, 2005.

Sen, Zekai. *Solar Energy Fundamentals and Modeling Techniques: Atmosphere, Environment, Climate Change and Renewable Energy*. New York: Springer, 2008.

Squires, Gregory D, *Urban Sprawl: Causes, Consequences, and Policy Responses*. Washington: Urban Institute Press, 2002.

Stone, Deborah A. *Policy Paradox: The Art of Political Decision Making*. Rev. ed. New York: Norton, 2002. Print.

Smart Growth Online. "*Principles of Smart Growth*" The Smart Growth Network. www.smartgrowth.org/about/principles/default.asp

Schwanke, Dean, et al. *Mixed Use Development Handbook.* Second Edition. Washington, D.C.: ULI - the Urban Land Institute, 2003.

Tachieva, Galina. *Sprawl Repair Manual* . Washington: Island Press, 2010. Print.

Temple University Center for Public Policy and Eastern Pennsylvania Organizing Project. "*Blight Free Philadelphia: a Public-Private Strategy to Create and Enhance Neighborhood Value.*" Philadelphia, 2001

The Congress for New Urbanism. "*Sprawl Retrofit Initiative*"

United States Bureau of Labor and Statistics, *Establishment Data: Earning*. Washington, DC 2010

United States Census Bureau, *American Community Survey*, 2008

U.S. Energy Information Administration, *Monthly Energy Review* April 2010

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